



2007



2021



2051

Community Greenhouse Gas Reduction Strategy

March 20, 2012



Copies of this report may be viewed on the website: www.coquitlam.ca

Or at:

Coquitlam City Hall
3000 Guildford Way
Coquitlam, BC

This Strategy was prepared by HB Lanarc Consultants in 2010/11 with City of Coquitlam staff.

Executive Summary

The Community Greenhouse Gas Reduction Strategy is a document that sets the course for short and long term action in Coquitlam, touching on the major sources and drivers of emissions in the areas of land use, transportation, buildings, energy supply and solid waste.

The City is committed to contributing to provincial, federal and global efforts to protect the climate. Policies and actions will reinforce and refine the City's existing commitments to a network of complete and compact centres within the City, a sense of place, local job creation, strengthening housing and transportation choice, and protecting the environment for present and future generations. The City will work in partnership with residents, businesses, non-profit organizations, utilities, neighbouring local governments and senior governments to achieve deep emission reductions. We will strive to align our Greenhouse Gas Reduction Strategy with the City's land use, development, transportation, infrastructure, and solid waste planning.

Strategy Objectives

The Community Greenhouse Gas Reduction Strategy builds on the City's Strategic Plan, Official Community Plan, Strategic Transportation Plan, and the commitment to Metro Vancouver's *Zero Waste* goal. While the community's emissions are still growing, recent policies and actions have begun to slow this growth, and this trend is forecast to continue.

This Strategy supports the *targets, policies* and *actions* integrated into Coquitlam's Official Community Plan Amendment, in accordance with the Local Government Act (Bill 27, 2008). As well as supporting ongoing measurement and monitoring, the targets are intended to inform more detailed analysis necessary at the next stage of planning and implementation. It is expected that targets, policies and actions will be refined as these plans evolve.

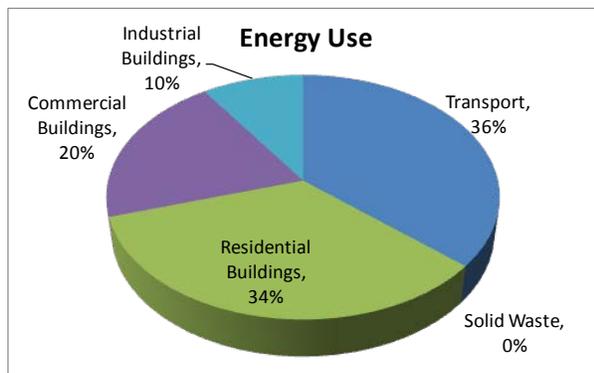


The objectives of the Strategy are several-fold:

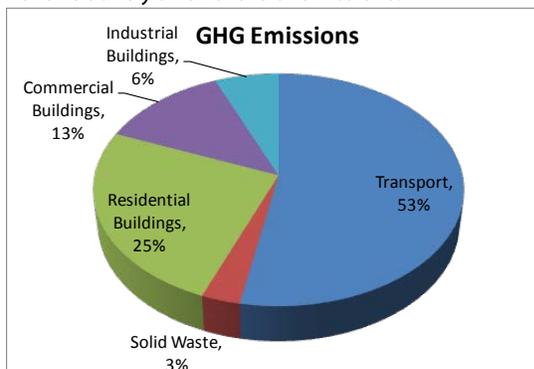
- Provide high level sector-specific policies and actions to reduce emissions that are locally relevant and within the authority of the City and support the legislative requirement to include emission reduction targets, policies and actions in the Official Community Plan;
- Develop GHG reduction targets at a community-wide basis and indicators at a sector level that are locally relevant, defensible as well as meaningful for policy and program development on climate change and broader local government activity;
- Integrate existing City land use, transportation and infrastructure planning activity into the process by strengthening their climate and energy benefits, enriching understanding of their GHG impact, and providing useful indicators and targets to support these policies and plans;
- Identify energy and carbon cost savings from the policies and actions selected by the City; and,
- Communicate how emission reductions and sustainable energy reinforce existing community priorities, notably mobility, economic development, risk management and liveability.

2007 Energy and Emissions Profile

Community Energy Use: As with most BC communities, Buildings use a majority of community energy, followed by Transportation.



Community Emissions: As with Energy Use, Transportation and Buildings are the largest sources of emissions. Solid Waste sent to landfill is responsible for a relatively small share of emissions.



In 2007, Coquitlam residents, businesses and the municipal government were responsible for emitting a combined 623,686 tonnes of carbon dioxide equivalent (CO₂e). This calculates to 5.2 tonnes of CO₂e per capita. A useful indicator for comparing emissions among different cities considers total annual emissions in relation to the combined number of residents and jobs:

$$\frac{\text{Annual Emissions (CO}_2\text{e)}}{\text{Residents + Jobs}} = \text{Average CO}_2\text{e per resident \& job}$$

For Coquitlam in 2007, this works out to 3.8 tonnes CO₂e per resident/job¹, compared with an average of 4.3 tonnes CO₂e per resident/job for Metro Vancouver communities.² It is important to note that Coquitlam is one of the higher growth municipalities within the Metro region, presenting both challenges and opportunities for addressing climate change. Furthermore, the City is also influenced by its location in the middle of a large metropolitan area, at the convergence of major provincial and regional transportation routes.

Energy Spending and Economic Development

In 2007 Coquitlam residents, businesses and the City consumed 12.6 million GJ of energy, translating to an estimated \$274 million in energy related expenditures, or \$5,000 per residential household. The vast majority of this spending leaves town. With rising electricity and oil costs, these expenditures – along with the economic vulnerability of many people – will dramatically increase. **The land use, buildings, and district energy actions in this Strategy are intended to keep a larger portion of these expenditures in the community, stimulating the local economy.**

¹ Total 2007 emissions is from CEEI 2007, with modifications to the waste sector by HB Lanarc. 2007 population estimate from BC Stats 2009 Coquitlam Community Profile. 2007 jobs estimated based on 2006 Census figure.

² The regional average was calculated in: City of North Vancouver 2009. CEEI Report Review and Comparison to Metro Municipalities.

Targets

Coquitlam will work in cooperation with senior levels of government to reduce the City's annual **community-wide greenhouse gas emissions 15% below 2007 levels by 2031** and **per capita greenhouse gas emissions 30% below 2007 levels by 2021**.

Actions

The actions are summarized below by sector:

Land Use determines where residents live, work, shop, and play, and influences how they get there. Land-use policies strongly influence energy use and emission from transportation and buildings.

Goals

- Increase the percentage of complete, compact design in new and existing neighbourhoods to reduce travel distance and frequency of vehicle trips
- Establish a built form and mix of uses that supports liveability and healthy lifestyles
- Foster urban development that encourages efficient use of existing and planned infrastructure.

Actions

- A. Explore the longer term transition of low density neighbourhood commercial centres to vibrant, walkable mixed-use nodes. To improve access to daily needs for Coquitlam residents, also give consideration to strategically extending existing commercial centres or establishing new ones, scaled to the neighbourhood context.
- B. Explore broader opportunities for facilitating new housing choices in Southwest Coquitlam's lower density neighbourhoods. Continue to encourage Secondary Suites and Infill Cottages for their inherent superior energy performance.
- C. Continue to support further transition of the City Centre to a highly urban and vibrant downtown with a mix of land uses and employment opportunities.
- D. Support integration of the planned Evergreen Rapid Transit Line through station area planning that considers transit oriented land uses and densities.
- E. Support future direct, frequent transit services between City Centre and communities south of Fraser via the Lougheed corridor with transit supportive land uses around stops in the longer term.
- F. Focus the majority of growth within 800 metres of high frequency transit service.
- G. Explore opportunities to integrate more live/work uses throughout the City.
- H. Explore implementation tools to provide greater opportunities for smaller format commercial offices in neighbourhood centres to encourage and support small businesses.
- I. Create opportunities for a diversity of service and entertainment destinations in neighbourhood centres.

Transportation produces a majority of Coquitlam’s emissions. The actions in this sector and the Land Use sector will complement those in the Strategic Transportation Plan.

Goals

- Create street/road designs that promote active transportation (walking/cycling) and public transit use;
- Enhance parking standards and parking management to reduce vehicular ownership, driving trips and driving distance;
- Reduce overall expenditures on energy in the transportation sector;
- Mitigate increases in travel time caused by single occupancy vehicle congestion through greater transportation choice;
- Reduce the annual per capita vehicle kilometres traveled through greater transportation choice, compact complete communities, and local employment;
- Support major rapid transit lines to facilitate efficient transportation to, from and within the City; and,
- Support Provincial efforts to improve vehicle efficiency through means within municipal authority.

Actions

- A. Support continued and steady implementation of new cycling and pedestrian facilities in coordination with the Strategic Transportation Plan, as amended.
- B. Work with transit planning/operational authorities to implement priority measures that support transit throughout the City, in coordination with the Strategic Transportation Plan and Neighbourhood Plans, as amended (e.g. support for frequent transit network service, separate bus lanes, signal systems, queue jumpers).
- C. Increase walking and cycling connectivity and infrastructure at the neighbourhood scale, beginning with the City Centre.
- D. Promote, and where possible invest in transportation demand management (TDM) measures in new developments and in neighbourhood centres and the City Centre (e.g. car sharing, bike end-of-trip facilities, telecommuting, parking management).
- E. Explore the development of policies to support low emission vehicles – hybrids, plug-in electric, full electric vehicles, electric scooters (e.g. dedicated premium parking, vehicle charging stations).
- F. Work with key partners to promote education & outreach programs to support sustainable transportation – walking, cycling and transit (e.g. TransLink Travel Smart Program).

Buildings - Most GHG emissions from buildings result from natural gas used for space and water heating. The focus of Coquitlam's actions is shifting towards higher density, mixed use developments, which will lower emissions from buildings and transportation.

Goals

- Improve the energy efficiency of *new* and *existing* residential, and commercial/institutional buildings;
- Promote renewable energy in *new* and *existing* residential, commercial/institutional buildings;
- Strengthen per capita and per unit energy and emission performance through consideration of building/dwelling types and unit sizes (i.e. high efficiency multi-unit buildings, smaller unit sizes, suites);
- Reduce overall expenditures on energy for City residents and businesses;
- Build on the City's commitment to housing diversity to promote access and support opportunities for aging in place.

Actions

- A. Continue to support a high increase in multi-unit residential and mixed use development.
- B. Explore strategic outreach and education opportunities to encourage building owners and users to reduce energy use and solid waste, and invest in renewable on-site energy (commercial, institutional, light industrial and residential).
- C. Explore opportunities for strategic outreach and education for developers, realtors and other stakeholders to promote energy efficiency, passive design and renewable energy technologies and practices.
- D. Explore market-sensitive land use tools to encourage higher performance buildings, passive design and renewable energy (e.g. development permit areas, streamlining approval of permits, rezoning, and development cost charges).

Energy Supply, as determined by its source and type, influences emissions in the buildings sector. Coquitlam is already exploring the potential for District Energy systems in several locations in the community. There are also opportunities at the building scale with renewable water heating technologies.

Goals

- Support development of low carbon district energy; and,
- Support on-site, building scale renewable heat and electricity opportunities.

Actions

- | | |
|--|---|
| A. Continue to encourage implementation of district energy in Northeast Coquitlam Village Centre and Waterfront Village Centre (Fraser Mills). | B. Explore potential opportunities for district energy systems in fast growing Coquitlam neighbourhood centres (both new and existing) and City Centre. |
|--|---|

Solid Waste - Diverting organic materials from landfill can reduce greenhouse gas emissions. There is substantial support and opportunity for collaboration with the regional district.

Goal

- Annually reduce waste generation and increase waste diversion in striving to achieve Zero Waste.

Actions

- | | |
|--|---|
| A. Support Metro Vancouver efforts to increase recycling and diversion of organic waste through City programs and initiatives. | B. Encourage provincial and federal governments to legislate measures to reduce waste through mechanisms such as extending responsibility of waste to the manufacturing companies, product stewardship and targeting the reduction of wasteful packaging. |
|--|---|

Community Wide and Corporate Action Synergies reach across traditional energy and emission sectors and municipal departments and extend out into the community. The actions will help ensure Coquitlam’s municipal operations business activity facilitates the community’s GHG reduction targets.

Goals

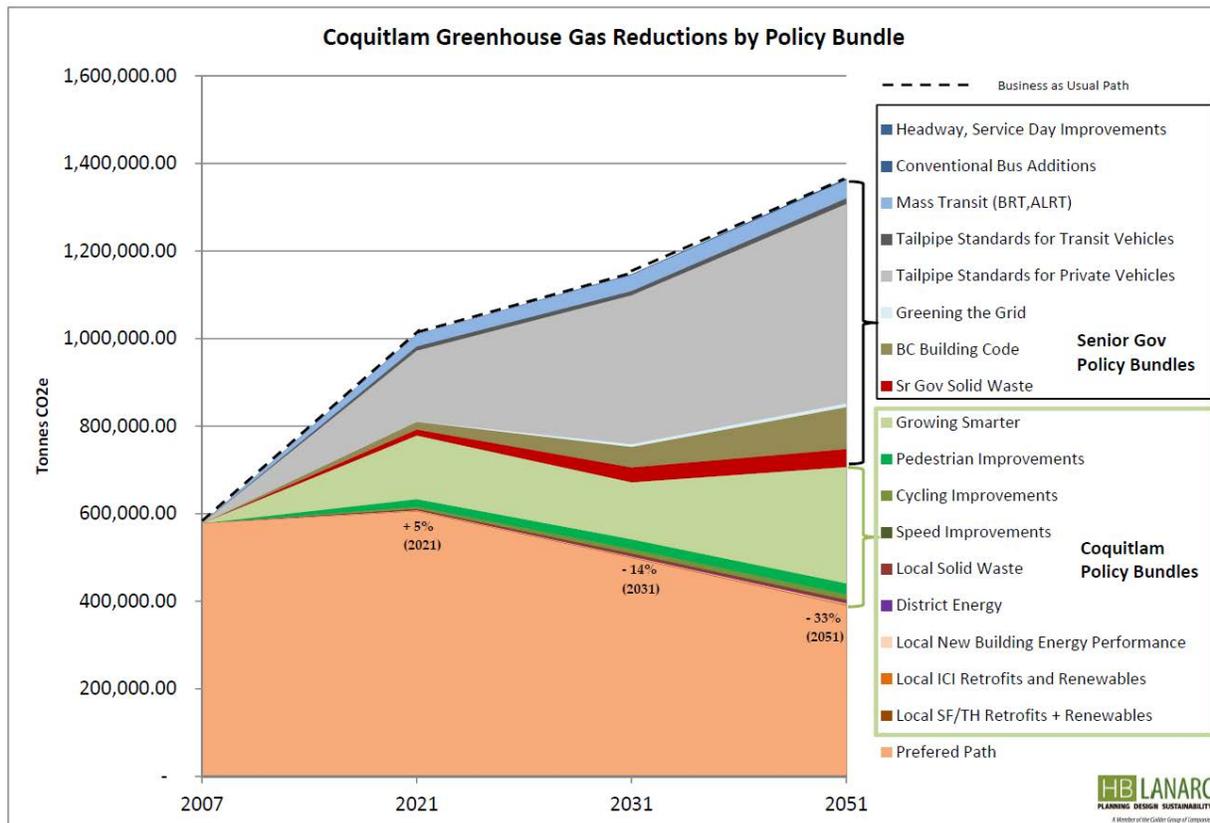
- Provide preliminary direction for strategic navigation of future carbon and energy policy developments, taking advantage of local economic development opportunities; and,
- Strengthen the City’s capacity to implement the actions in this Strategy.

Actions

- | | |
|---|--|
| A. Decision Making Climate Lens – Explore and evaluate opportunities to integrate mechanisms into Council and staff decision making to understand and evaluate the life cycle costs and carbon implications of large capital expenditures to better inform decision making. | C. Community Carbon Offset Framework – Explore the potential benefits of developing a framework for offsetting Coquitlam’s corporate carbon emissions with high quality community projects that are based on the first principles and general approach for such projects. |
| B. As an initial step in developing an implementation plan, evaluate near term and incremental costs associated with available options to implement high level actions. | D. Community Energy and Emission Manager – Explore and evaluate the feasibility of developing a staff position to support Strategy implementation. The Community Energy Manager could play a central role in liaising with City departments and community stakeholders to implement the actions identified in each sector. |

Modeled Emissions Reductions

The figure below illustrates emission reductions by policy wedge below the Business as Usual (BAU) path for Coquitlam. The magnitude of the reductions as a result of Coquitlam policies and actions changes as time goes forward depending on anticipated growth and the phasing of actions. Implementation actions over the next 10 years will be critical to lay the groundwork for deeper emission reductions in later years.



Monitoring Progress

Monitoring change in key indicators over time is one of the most effective mechanisms to track the City's progress towards meeting its emission reduction targets. By tracking indicators the City can also identify areas where adjustments in focus are necessary. The strategy identifies indicators in each sector and supports future monitoring with a working Monitoring and Indicators Matrix in Section 6.2.

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1. Introduction and Vision

The Community Greenhouse Gas Reduction Strategy is a document that sets the course for short and long term action, touching on the major sources and drivers of emissions in the areas of land use, transportation, buildings, energy supply and solid waste.

Vision

The Community Greenhouse Gas Reduction Strategy builds on and provides direction for existing City of Coquitlam policies and plans. It recognizes the shared responsibility for making the deep emission reductions the balance of scientific evidence concludes is necessary to avoid serious, irreversible consequences of climate change to humanity. The Strategy reinforces an integrated sustainability agenda that addresses long term economic, social and environmental priorities, building a healthier, more resilient community. The following vision guides the Community Greenhouse Gas Reduction Strategy:



Photo: Jordon Kok, Coquitlam

The City is committed to contributing to provincial, federal and global efforts to protect the climate. Policies and actions will reinforce and refine the City's existing commitments to a network of complete and compact centres within the City, a sense of place, local job creation, strengthening housing and transportation choice, and protecting the environment for present and future generations. The City will work in partnership with residents, businesses, non-profit organizations, utilities, neighbouring local governments and senior governments to achieve deep emission reductions. We will strive to align our Greenhouse Gas Reduction Strategy with the City's land use, development, transportation, infrastructure, and solid waste planning.

Vulnerability to Climate Change

Climate change has global and local implications to ecosystems, infrastructure and people. Property damage from extreme weather events has doubled in Canada every 5-10 years over the past half-century. A climate change finger print is clearly visible in this damage. From droughts to drinking water shortages, and floods to fires, local governments are often on the front line when disasters strike. Local governments also have a significant influence on greenhouse gas emissions at the local level.



Local Government Authority to Reduce Emissions

Half of BC's emissions are influenced by local government decisions. The largest source of emissions is carbon dioxide from combusting fossil fuels used to move vehicles, heat and power our buildings, and provide energy for the services delivered by the City. A smaller portion of emissions comes from methane produced from decomposing waste. Community and neighbourhood plans, and transportation and infrastructure systems profoundly impact transportation, building and waste emissions for individuals, communities, and in turn provincial and national emission profiles.

- Develop GHG reduction targets on a community-wide basis and indicators at a sector-level that are locally relevant, defensible as well as meaningful for policy and program development on climate change and broader local government activity;
- Integrate existing City land use, transportation and infrastructure planning activity into the process by strengthening their climate and energy benefits, enriching understanding of their GHG impact, and providing useful indicators and targets to support these policies and plans;
- Identify energy and carbon cost savings from the policies and actions selected by the City; and,
- Communicate how emission reductions and sustainable energy reinforce existing community priorities, notably mobility, economic development, risk management and liveability.

Approach and Methodology

The policies and actions that comprise the Strategy were developed through a combination of expert opinion and input from City staff, citizens and Council. The decision making process was supported by the use of the Community Energy and Emissions Mapping and Planning (CEEMAP) Tool in order to forecast the impact of different policies and actions on GHG emissions in the years 2021, 2031 and 2051. The GHG emission and energy use numbers presented in this report for future years were generated using a dynamic modelling approach developed by HB Lanarc specifically to assist local governments with the task of GHG emission and energy target setting and policy development. HB Lanarc's approach uses a combination of geographic information system (GIS) spatial analysis and information contained in databases to model the effect of various land use, urban form and transportation changes, green building measures and other emission reduction measures over selected time periods (in this case, 2007 to 2051). A complete description of the modelling methodology is provided in the supplementary technical compendium.

Briefly, the modelling approach involved the following steps:

1. Establishing a baseline for all the variables for the selected base year, 2007;
2. Forecasting population, building type and employment growth including spatial distribution of these variables;
3. Forecasting transportation-related emissions using a spatial model that outputs car/truck and transit vehicle-kilometres-travelled (VKT) based on Coquitlam specific inputs for its road network, land uses, location of employment and services, pedestrian and bicycle infrastructure, and socio-economic characteristics;
4. Modelling changes in vehicle fuel emission standards over time including vehicle replacement rates;
5. Modelling building-related emissions by applying a number of building archetypes to the projected new, replaced and retrofitted development. Each building archetype includes assumptions about energy intensity per square metre, building size, and energy source (including whether or not it is connected to district energy); and,
6. Modelling solid waste-related emissions using a progressive change in waste generation and diversion rates over time.

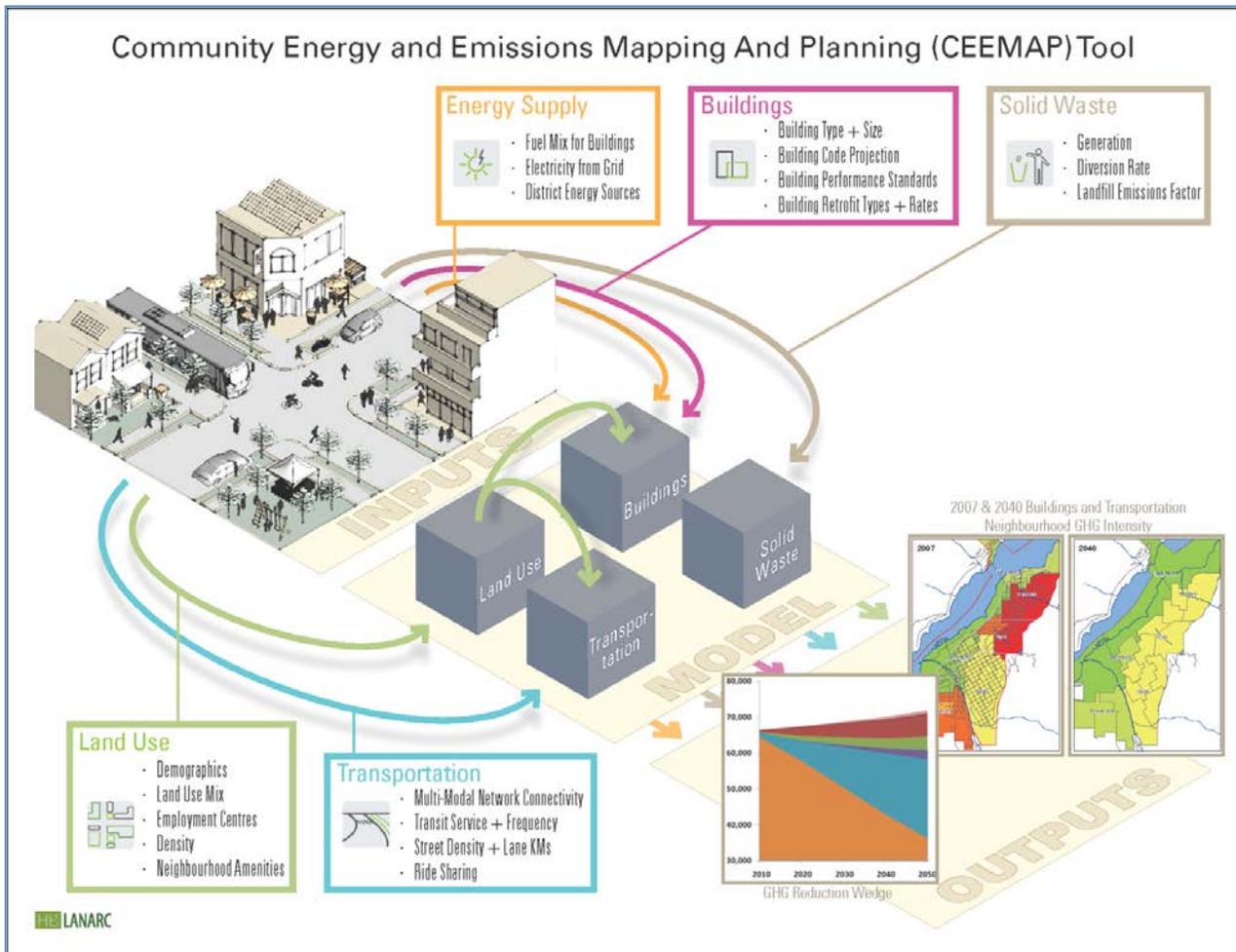


Figure 2 - CEEMAP Conceptual Diagram

This technical process was supported through active engagement with Council, staff, and the public.

- Workshops and meetings with Council through the Land Use and Economic Development Committee;
- A series of public open houses;
- Workshops with a staff Interdepartmental Working Group including representation from Community Planning, Corporate Planning, Development Services, Engineering and Public Works, Environmental Services and Infrastructure Management; and,
- Strategic planning meetings with a project executive led by the Planning and Development department in close collaboration with Engineering and Public Works.

The process involved collaborating with these constituencies to gather ideas on a direction that should be pursued, as well as getting feedback on the path that was eventually developed. The rigorous modeling method required active participation by staff across the organization in shaping the policies and actions and the quantitative impact they could have on emission reductions.

Strategy Format

The Strategy is organized into six sections, plus appendices:

Section 1: Introduction and Vision – shares the City’s vision and current sustainability activity from which the Strategy is based, and outlines the approach taken for its development.

Section 2: Coquitlam Climate and Energy Context – examines the global and regional climate and energy context for the Strategy and provides a profile of the City’s energy and emissions.

Section 3: Taking Action – describes the targets, goals and actions of the Strategy by each of the major sectors: land use, transportation, buildings, energy supply, solid waste and community-wide and corporate synergies.

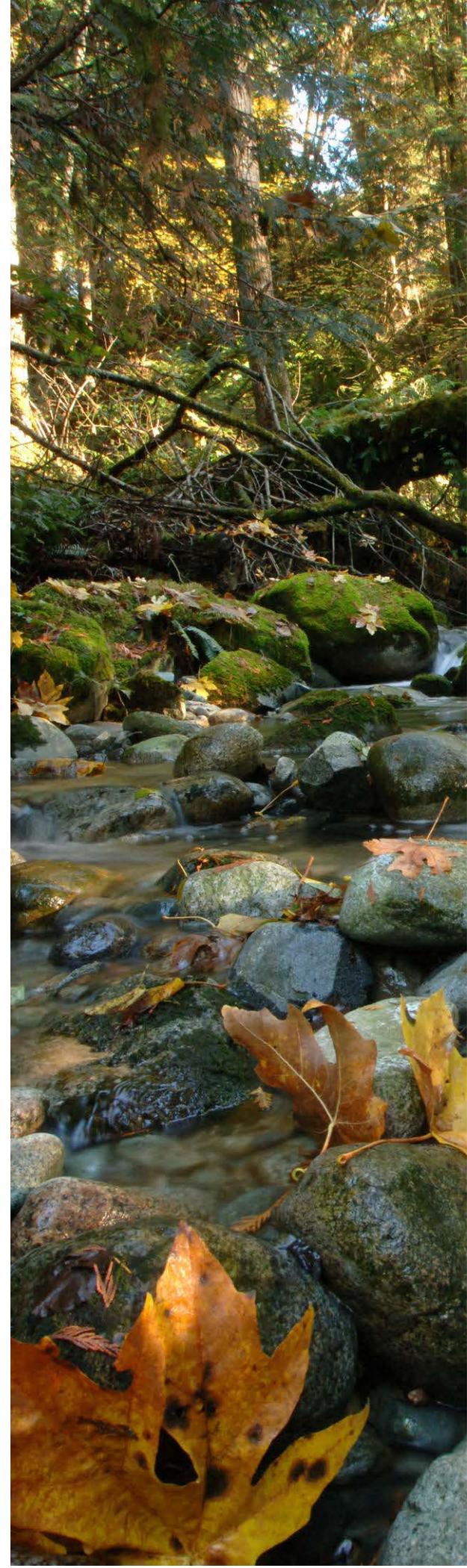
Section 4: Neighbourhood Vitality and GHG Reduction Approaches – provides strategic guidance for operationalizing the policies and actions according to the unique neighbourhood contexts of the City.

Section 5: Advancing Implementation – recommended short to medium term next steps

Section 6: Tracking Action and Monitoring Progress – provides additional details relevant for planning, prioritizing and tracking progress on the actions described in this strategy.

Appendix A: OCP Amendment (Adopted May 10, 2010 through Bylaw 4110, 2010)

Appendix B: Green Building Tools and Opportunities



2. Coquitlam Climate and Energy Context

Coquitlam is a City of diverse character comprised of an assemblage of distinct neighbourhoods and geographies. This diversity of neighbourhoods is important to recognise when examining the City's current energy and emission profile and devising policies and actions to reduce GHG emissions going forward.

Community Profile

Buildings and Land Use

Approximately 44% of the greenhouse gas emissions and 64% of the energy used in the City are from buildings. The use of electricity and natural gas by residential buildings constitutes the largest share of energy and greenhouse gas emissions in the buildings sector. In commercial and residential buildings electricity is used for heating/hot water, lighting and appliances and natural gas for space heating and heating hot water.

The key factors for residential and commercial buildings are:

- Building energy efficiency, influencing energy consumption;
- Energy sources – e.g. hydro-electricity, natural gas, solar thermal; and,
- Building type and size.

Building elements that contribute to efficiency include:

- Envelope performance (e.g. insulation, windows);
- Efficiency of lighting;
- Ventilation heat recovery;
- Hot water demand;
- Hot water and space heating/cooling from renewables (e.g. solar thermal, geo-exchange, wood); and,
- Efficiency of appliances.

The above elements are in turn influenced by the following factors.

Climate & Aspect

Given the limited amount of sunlight in Coquitlam, particularly in the heating seasons, building orientation is not expected to have a significant effect on existing building performance, with the potential exception of the addition of solar thermal collectors for hot water heating. For new buildings, sites with solar exposure may be able to reduce energy consumption via advanced passive design and solar thermal collectors.

Housing Type and Size

In principle, attached and multi-family buildings tend to consume less energy per unit floor area than detached buildings due to shared walls and less exposed surface.

Profile

Population: 120,286 (2007 est.)

2001-2006 Population Growth: 1.5% (1,675)

Projected Population in 2041 (RGS): 224,000

Population Density (2007 est): 2,100 people / km² (within urban growth boundary)

Jobs in Coquitlam (2006): 46,000

Projected Jobs in 2041 (RGS): 94,000

Combined per Resident and Employee GHG Emissions in Coquitlam (2007): 3.8 Tonnes CO₂e

Average in Metro Vancouver Communities (2007): 4.3 Tonnes CO₂e

Modal Split Commute Trips (2006 Census):

	Coquitlam Region	
<i>Car/Truck Driver:</i>	71%	67%
<i>Car/Truck Passenger:</i>	7%	7%
<i>Public Transit:</i>	13%	17%
<i>Walk:</i>	4%	6%
<i>Bicycle:</i>	1%	2%
<i>Other:</i>	2%	1%

	Coquitlam Region	
Ave. Commute Distance: (km)	10.6	7.4

However this is not always the case – for existing buildings, energy consumption per unit floor area is often similar between attached and detached dwellings. This is likely due to differences in construction standards and practices, as well as the fact that many multi-family buildings (i.e. Part 3/High Rise of BC Building Code) have significant common areas. However, data from BC Hydro³ suggests that the per-person energy use of residential buildings is 23% lower for apartment towers compared to single-family residences. When viewed on a population basis, higher density development with larger multi-family buildings reduces building energy consumption and GHG emissions.

Coquitlam’s existing land use plans direct growth in the form of more multi-family housing units which will move the City towards a building mix that will reduce GHG emissions and energy use in the buildings sector. Table 1 below shows that single family homes constitute 54% of the floor area in the residential building sector. This percentage will decrease over time as the square footage of multi-family building types increases.

Table 1

<i>City of Coquitlam Housing Mix by Floor Area, 2007⁴</i>		
Residential Building Type	Percentage	Total (sq ft.)
Duplex	4.4%	2,727,460
Residential Dwelling with Suite	6.5%	7,501,142
Row Housing (Single Unit Ownership)	4.2%	2,048,309
Single Family Dwelling	54.2%	47,486,004
Strata-Lot Residence (Condominium)	27.6%	10,483,804
Other	3.0%	1,350,000
Total		71,632,480

Building Age and Construction Standards

Another important factor in energy use in buildings is the age of the building. Based on EnerGuide⁵ assessments of existing houses in BC, on average the older the home, the higher the energy consumption on per-area basis.⁶ Based on 2007 BC Assessment Authority data, approximately 25% of private dwelling stock in the City was constructed before 1970. Typical life-spans of these dwellings are 40 to 60 years. Therefore, only modest redevelopment of properties over the next 20 years can be expected without implementing other policies. Forty percent of private building stock was constructed between 1971 and 1990. Many of these dwellings likely have older and less efficient furnaces and single glazed aluminum windows. Renovation of these units to reduce energy consumption can potentially have a significant impact on community energy use.

³ Nelson, Dennis and Harinder Bains 2011. BC Hydro – Apartments Report, Version 4. January 2011. BC Hydro Load Analysis.

⁴ Data provided by the City of Coquitlam from the BC Assessment Authority (2009).

⁵ EnerGuide is the official Government of Canada program for rating the energy consumption and efficiency of specific products including appliances, heating and cooling equipment, houses and vehicles. EnerGuide includes a house energy evaluation, including tests to find air leakage and the energy efficiency of its heating.

⁶ Natural Resources Canada 2008. EcoEnergy retrofit data on actual energy savings by province and year built for retrofitted residential homes.

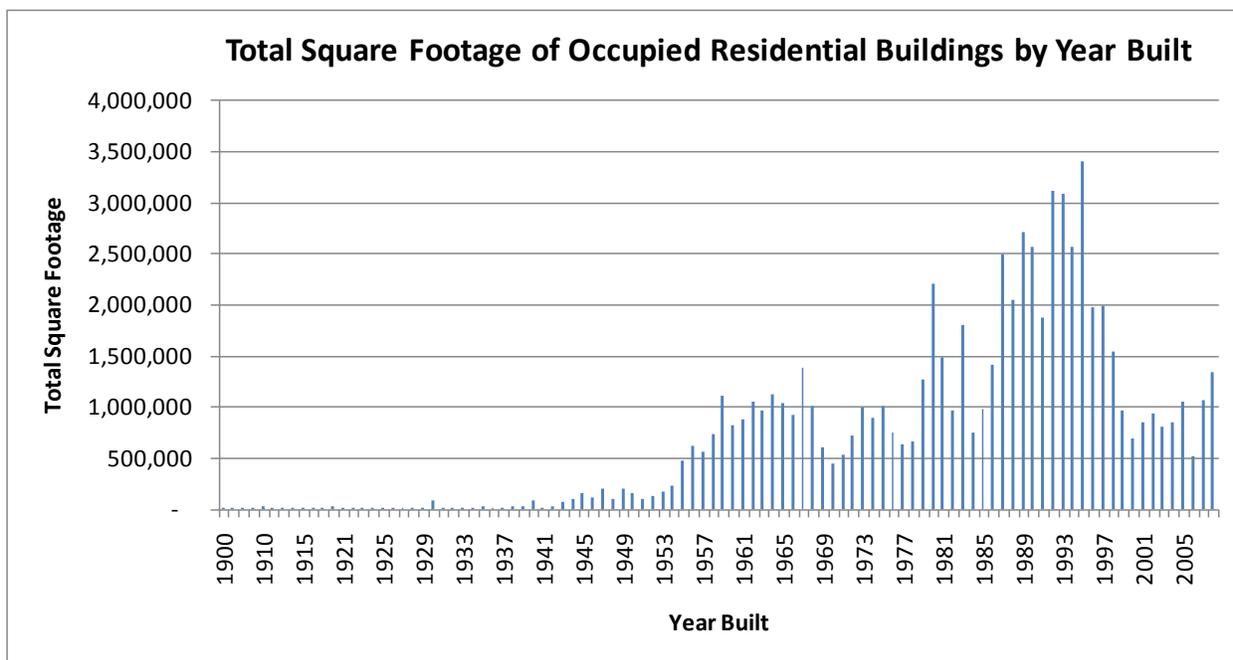


Figure 3– COQUITLAM Total Square Footage of Occupied Residential Buildings by Period of Construction (2007) ⁷

Type of Energy Supply

In British Columbia, most electricity is generated from large hydroelectric dams, which do not produce greenhouse gas emissions. As a result, emissions from electricity use in the Province are among the lowest in North America. An inventory of the number of buildings that are using renewable energy for heating and electricity generation in Coquitlam has not been conducted, but is expected to be very small. District energy systems are one of the most efficient forms for heating commercial and multi-unit residential buildings and are also flexible in the type of fuel that they use to generate heat. Citywide Official Community Plan policy currently includes direction for a future district energy system in Waterfront Village Centre, feasibility analysis for Northeast Coquitlam’s future village centre and encouragement to explore opportunities in the City Centre.

Transportation and Land Use

Compact, complete and mixed-use development creates urban form that increases liveability and accessibility, while decreasing resource use and greenhouse gas emissions associated with transportation. Coquitlam has put in place neighbourhood and community plans to move in this direction, but the City’s current land use mix and transportation network are not conducive to low carbon transportation in most neighbourhoods.



⁷ Data provided by the City of Coquitlam from the BC Assessment Authority (2009).

Employment Centres

An increase in the number of jobs within a 5 kilometre radius of a neighbourhood can greatly reduce auto vehicle-kilometres-traveled (VKT) per household.⁸ This is also correlated with distance to the central business district. There is a concentration of jobs in Southwest Coquitlam, but largely residents work in other Metro Vancouver cities. The average distance to work for Coquitlam residents was 10.6 kilometres versus the Metro Vancouver average of 7.4 kilometres in 2006.⁹



Land use mix

A mixed land use provides nearby options for working, shopping, school, and recreation that, as a result, decrease auto dependency.¹⁰ Coquitlam's City Centre and its neighbourhood centres are increasingly becoming walkable with a diversity of key destinations, but these are not readily accessible by transit, walking and cycle by a majority of residents.

Density

Density is the "critical link that ties land use and transportation planning together."¹¹ In urban areas of Metro Vancouver, per capita VKT are 40% less than in suburban areas, which have half the density of urban areas. Analysis from cities across North America has shown that that both increased employment and housing densities leads to decreasing vehicle kilometres traveled.^{12 13 14}

Proximity to transit and transit frequency

It is more likely that people will choose transit as their travel mode if it is convenient. In general, there is a fairly strong positive correlation between the distance from a rapid transit station and auto VKT per household.^{15 16}



⁸ IBI Group 2000. Greenhouse Gas Emissions from Urban Travel: Tool for Evaluating Neighbourhood Sustainability. Prepared for: Canadian Municipal Planning Corporation.

⁹ Statistics Canada, 2006 Census.

¹⁰ Hunt Analytics. 1999. The Impact of Urban Form and Travel Accessibility on Private Vehicle Use. Canada Mortgage and Housing Corporation: Ottawa, Ontario.

¹¹ David Suzuki Foundation (2001) *Climate Crisis: Energy Solutions for BC*. Vancouver, BC: David Suzuki Foundation.

¹² IBI Group 2000. Greenhouse Gas Emissions from Urban Travel: Tool for Evaluating Neighbourhood Sustainability. Prepared for: Canadian Municipal Planning Corporation.

¹³ Chen et al (2008). Role of the built environment on mode choice decisions: addition evidence on the impact of density. *Transportation*, 35: 285-299.

¹⁴ National Research Council (2009). *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO₂ Emissions*. The National Academy of Sciences. Washington, DC

¹⁵ IBI Group 2000. Greenhouse Gas Emissions from Urban Travel: Tool for Evaluating Neighbourhood Sustainability. Prepared for: Canadian Municipal Planning Corporation.

¹⁶ Frank et al. (2008) "Urban Form, Travel Time, and Cost Relationships with Tour Complexity and Mode Choice," *Transportation* (35).

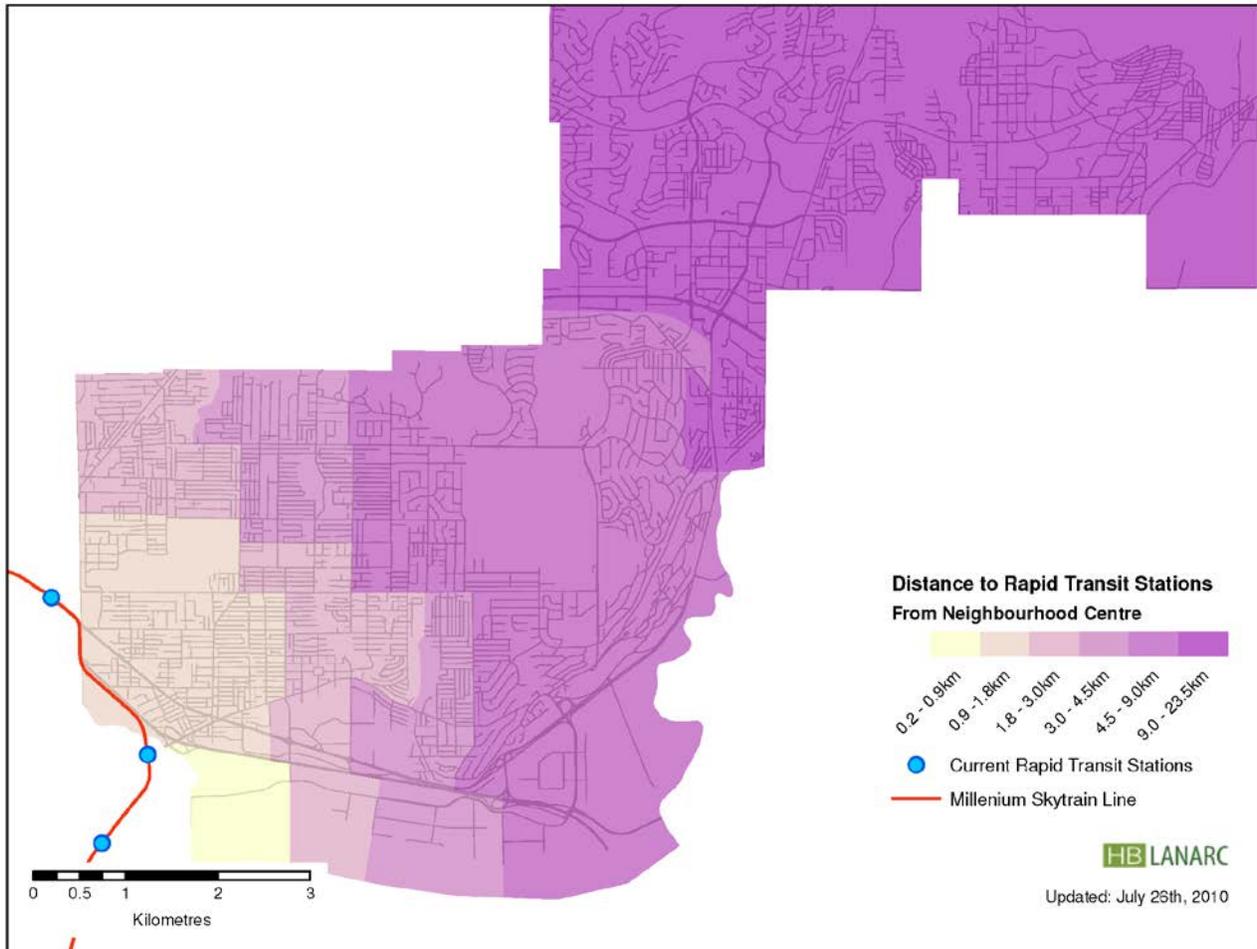


Figure 4 - Average Distance to Rapid Transit for each Traffic Zone

Walking, Bicycle, and Transit Connectivity

Conventionally, most energy, resources and money is dedicated to making automobile travel more convenient at the expense of other modes. Reducing travel time for cars stimulates more driving and less transit and walking, cancelling out the achievement of policies and goals that would otherwise occur from higher levels of density, mixed use, and street connectivity. Reducing the travel time for walking, bicycles, and transit will increase the share of travel that is conducted by these modes.

Solid Waste

An examination of GHG emissions in the waste sector is a natural forum for calling into question the boundaries that are drawn for the purpose of emission accounting. Everything that is purchased and discarded by residents and businesses requires energy to make and transport, and has emissions associated with how it is disposed. Most accounting protocols, including that used in the BC Ministry of Environment Community Energy and Emissions Inventory (CEEI) reports, only look at the emissions associated with the disposal of goods and materials. So-called “upstream” emissions, those from manufacturing and transporting goods, is frequently far greater than the “downstream” emissions associated with disposal.



Since landfill GHG emissions are due primarily to organic waste, the amount of organic waste sent to the landfill is the primary factor in landfill emissions. Recent research suggests that the effectiveness of landfill gas capture, even when implemented, is variable and is generally much less than 100%.

For other upstream and downstream solid waste-related emissions, the amount of waste generated, and the amount recycled are key factors in determining emissions.



Greenhouse Gas Emissions and Energy Baseline

In 2007, Coquitlam residents, businesses and the municipal government were responsible for emitting a combined 623,686 tonnes of carbon dioxide equivalent (CO₂e). This calculates to 5.2 tonnes of CO₂e per capita. A useful indicator for comparing emissions among different cities considers total annual emissions in relation to the combined number of residents and jobs:

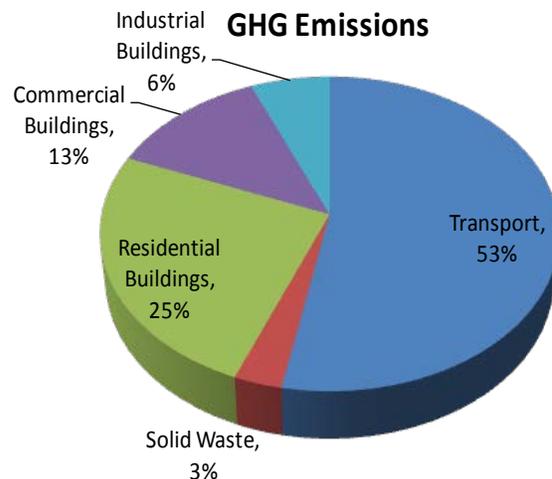
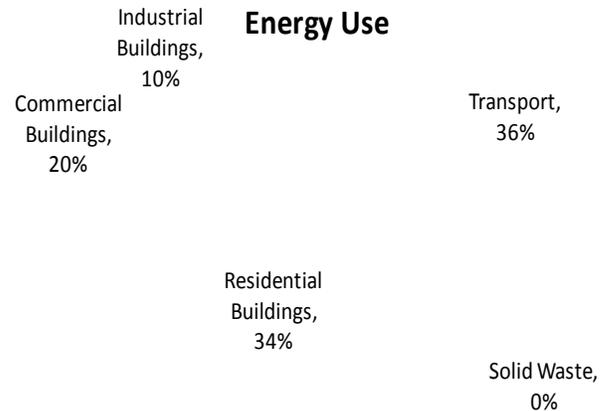
$\frac{\text{Annual Emissions (CO}_2\text{e)}}{\text{Residents + Jobs}} = \text{Average CO}_2\text{e per resident \& job}$
--

For Coquitlam, in 2007 this works out to 3.8 tonnes CO₂e per resident/job¹⁷, compared with an average of 4.3 tonnes CO₂e per resident/job for Metro Vancouver communities.¹⁸ While the ratio is slightly better than average for 2007, high anticipated population and job growth necessitate further efforts to effectively manage the extent of future emissions.

As well, in 2007 Coquitlam residents, businesses and the City consumed 12.6 million GJ of energy, translating to an estimated \$274 million in energy related expenditures.

It is important to note that Coquitlam is one of the higher growth municipalities within the Metro region, presenting both challenges and opportunities for addressing climate change. Furthermore, the City is also influenced by its location in the middle of a large metropolitan area, at the convergence of major provincial and regional transportation routes.

In addition to the emissions from the landfilling and incineration of solid waste, the community also influences the emissions associated with the manufacture and transport of goods and materials through purchasing choices. The greenhouse gas emissions that resulted from the manufacturing of the materials that were disposed of in Coquitlam in 2007 amounted to approximately 512,511 tonnes CO₂e.¹⁹ This figure is not included in the total community emissions number, but is an important indicator of the broader impact that consumption patterns in Coquitlam have on global greenhouse gas emission rates.



¹⁷ Total 2007 emissions is from CEEI 2007, with modifications to the waste sector by HB Lanarc. 2007 population estimate from BC Stats 2009 Coquitlam Community Profile. 2007 jobs estimated based on 2006 Census figure.

¹⁸ The regional average was calculated in: City of North Vancouver 2009. CEEI Report Review and Comparison to Metro Municipalities.

¹⁹ Calculated using material emission factors from: US EPA 2006. Solid Waste Management and Greenhouse Gases – A Lifecycle Assessment of Emissions and Sinks.

Energy use and greenhouse gas emissions can also be summarised by activity (see Table 2), which is useful for understanding the source of emissions within sectors. Table 2 shows that the majority of the emissions in Coquitlam are from the use of gasoline in vehicles (44%) and natural gas for space and water heating in homes and businesses (40%).

Table 2 – Coquitlam 2007 Energy Use, GHG Emissions and Expenditures by Energy Source²⁰

Activity Summary					
	Energy (GJ)	GHG Emission (CO ₂ e)	% CO ₂ e	Estimated Expenditures	Average Per Unit Costs
Electricity	3,067,062	18,743	3%	\$ 60,687,502	Res: \$0.0657/ kWh; Com & Ind: \$0.075/ kWh
Natural Gas	4,998,584	255,674	40%	\$ 74,067,691	Res: \$14.325 /GJ: Com & Ind: \$15.50 GJ
Gasoline	3,849,326	277,357	44%	\$ 120,277,564	\$1.083/ litre
Diesel	720,602	51,780	8%	\$ 18,976,348	\$1.086/ litre
Fuel Oil					
Propane					
Mobile Propane	20,318	1,220	0%	-	
Wood					
Solid Waste	0	18,911	3%	-	
Total	12,655,892	623,686		\$ 274,009,105	

Table 3 – Coquitlam 2007 GHG Emissions Baseline by Scope

GHG Emission Summary - By Scope								
	Scope 1 - Direct Emissions	Scope 2 - Indirect		Scope 3 - Downstream Waste Emissions				TOTAL
Source	CO ₂ - tonnes	Source	CO ₂ - tonnes	Source	CO ₂ - tonnes	CH ₄ - tonnes	N ₂ O - tonnes	CO ₂ e - tonnes
Natural Gas	255,675	Electricity	18,743	Solid Waste	12,491	257	3.318	18,911
Gasoline	277,357							
Diesel	51,779							
Mobile Propane	1,221							
Total	586,032	Total	18,743	Total	12,491	257	3.318	623,686

²⁰ Energy use and GHG emission numbers are from the 2007 CEEI report for Coquitlam, except for Solid Waste, which was calculated by HB Lanarc. Estimated expenditures were calculated using the average per unit price of electricity, natural gas and diesel in the Metro Vancouver region in 2007. Electricity costs are from BC Hydro rate guide. Natural gas costs are from Terasen rate guide. Gasoline and diesel costs are from NRCAN. Data was not available for other fuels.

Preliminary Simple Growth Forecast

Figure 5 shows a forecast of emissions going forward to 2050 using a “simple growth” scenario from the 2007 CEEI inventory. The *simple growth* forecast²¹ is based on the assumption that emissions will increase with population and job growth going forward using assumptions from the Metro Vancouver 2011 Regional Growth Strategy. Under this theoretical scenario emissions would increase approximately 93% by 2050. For the sake of comparison, if the City of Coquitlam chose to meet the equivalent of the BC Government’s reduction target of 33% reduction below 2007 levels by 2020, it would need to reduce annual emissions 212,365 tonnes below current levels. To meet the 80% reduction target by 2050, it would need to reduce annual emissions by 509,728 tonnes of CO₂e.

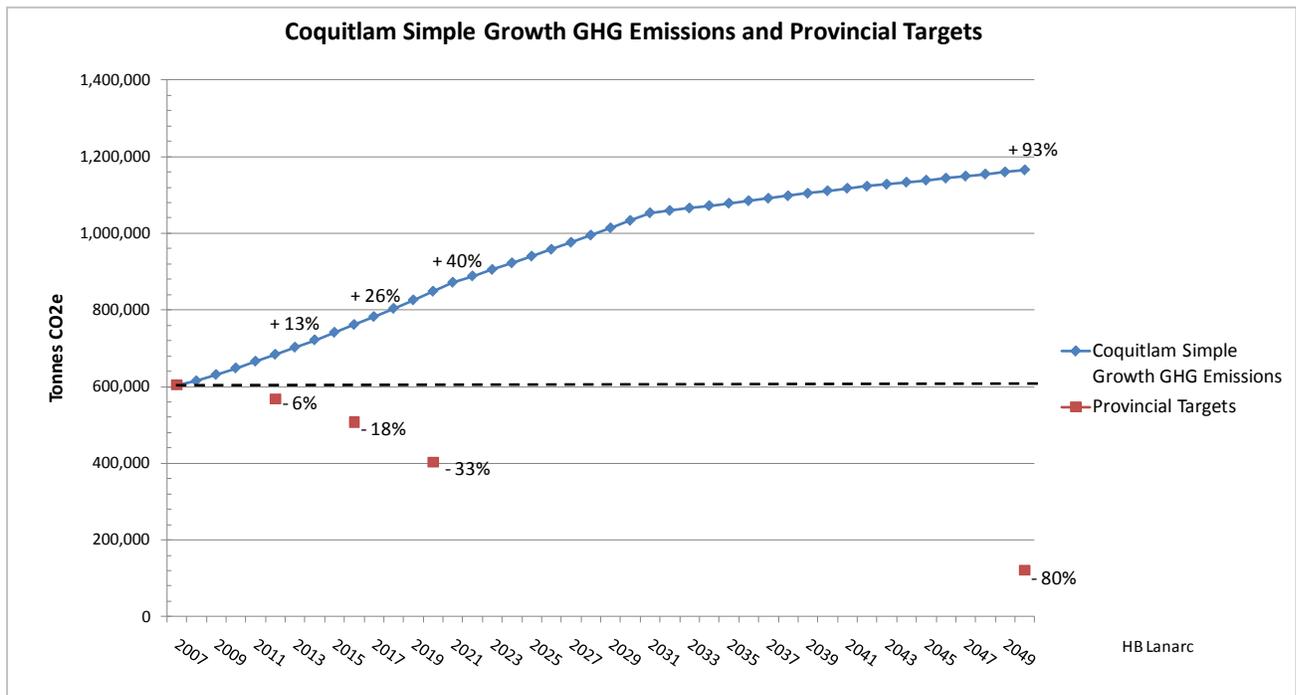


Figure 5 - Coquitlam Simple Growth Emission Forecast and Provincial Targets

²¹ It is important to note the *simple growth* forecast was conducted prior to the detailed modeling that is presented in Part 3 of the Strategy, and is different from the “business-as-usual” forecast in that section. See page 23 for a description of *business as usual*.

Current Activities

The City of Coquitlam has been developing and implementing policies and measures that advance an energy sustainability and emission reduction agenda. This existing activity is a foundation upon which the GHG Emission Reduction Strategy can be built. The sectoral overviews below summarize these developments.

Buildings

A number of Coquitlam's Area and Neighbourhood Plans encourage green, energy efficient building through voluntary design guidelines, and statements prioritizing energy efficient buildings. For example, Coquitlam's Waterfront Village Centre Neighbourhood Plan includes provisions for new multifamily and commercial buildings to meet a minimum of LEED or Built Green Silver equivalent, and connect to the future Fraser Mills District Energy System, using a restrictive covenant.

Moreover, these plans significantly increase the multi unit residential building ratio over single detached residential buildings – the greatest factor in advancing building performance on a per capita basis.

The City also provides educational materials for developers, including the Green Development Guide, offering case studies in green construction from throughout the Lower Mainland.

Land Use

The Citywide Official Community Plan (CWOCP) supports compact complete communities. Amongst other priorities, it includes a variety of high level strategies that reduce emissions over current land use: an increasingly diverse mix of land uses at a finer grain, facilitating active transport opportunities; transit oriented development; a variety of housing choices; the reinforcement and intensification of existing shopping and business areas; home-based employment. Likewise, Area and Neighbourhood Plans support a variety of these strategies. In some cases, the justification for such strategies is tied to emissions and air quality, though broader liveability co-benefits are rightfully recognized.

Examples of Policy Tools in Coquitlam's CWOCP:

- The Southwest Coquitlam Area Plan includes policy to direct the greatest share of new growth to designated centres;
- The Southwest Coquitlam Area Plan's Vital Economy policy specifies that a variety of incentives be investigated to stimulate development of office space in neighbourhood centres, in addition to policies in other parts of the plan encouraging more compact land use with access to transit;
- The City Centre Area Plan emphasizes the importance of employment in the plan's core area, specifying requirements for employment space in C-4 Zoned projects; and,
- The Waterfront Village Centre Neighbourhood Plan includes a checklist for developments, with a strong focus on compact land use strategies and a complete community.

Transportation

A number of important transportation planning initiatives that will affect Coquitlam are underway. The City is updating its Strategic Transportation Plan, including analysis of its future Bike Network and Transit Network. The Provincial Ministry of Transportation is currently planning the Evergreen rapid transit line project. Both initiatives have the potential to substantially impact transport choices and patterns in Coquitlam, and reduce emissions.

The OCP specifies that several areas of the road network should be developed as a multi-use facility serving the needs of pedestrians, cyclists, transit vehicles, automobiles, and commercial vehicles. It also includes direction to increase pedestrian and cyclist safety and comfort, especially between key nodes – indeed, the City more than doubled its bike network between 2007 and 2010 adding approximately 21 km. Action on this directive can increase cyclist and pedestrian mode shares on a piecemeal basis, reducing emissions.

Additionally, the City Centre Area Plan includes directives to develop transportation demand and parking management strategies, which are currently under consideration as a part of the Strategic Transportation Plan update.

Waste

The City's approach to solid waste management supports Metro Vancouver's Solid Waste Management Plan objectives and strategies to reduce the volume of waste going to landfills, and subsequent landfill and haulage emissions. Metro Vancouver has set a 70% waste diversion target for 2015 and 80% by 2020. As of 2011, the City has moved forward with several actions, such as organics collection and education for single family dwellings (Green Can program); mattress recycling for single family dwellings; continued blue bin recycling services for single family and multi family dwellings; education program for Coquitlam schools; composting education and subsidized compost bins; and waste and recycling outreach at community events.

Energy Supply

Coquitlam has a number of policies to promote local renewable energy, with an emphasis on district energy in certain areas of the City. While implementation has not yet started, the Fraser Mills development (Waterfront Village Centre) intends to have a district energy system and district energy options are under analysis for the future Northeast Coquitlam Village Centre. The City is also moving forward with district energy feasibility analysis for the City Centre civic precinct and evaluating the potential for broader application.

Section 6.1 provides a more detailed *Actions Tracking and Outlook* framework outlining existing and on-going actions in each sector. This framework is designed as a working document to be updated as implementation moves forward and new actions are identified to support each high level strategy.



3. Taking Action

Section 3 describes the policies and actions that are at the heart of this Strategy. They are organized by sector and include a snapshot of the GHG and energy modeling results based on their implementation.



Introduction

The development of policies and actions and the energy and emission modeling was conducted broadly along the lines of key sectors community-wide: land use, transportation, buildings, energy supply and solid waste. Due to the close relationships among the sectors, some of the analysis and policy development was done in an integrated manner.

Each sector will be addressed in following format:

- i. Brief description of relevance
- ii. Goals
- iii. Overview of direction and assumptions
- iv. Actions
- v. Vignettes (brief descriptions of select policies/actions or analysis and references that will help inform development of more detailed policies and plans.)
- vi. Potential further actions to explore to deepen GHG reductions
- vii. Relevant Indicators and Preferred Path

Policy Development and Modeling

A fundamental challenge is presented by the time scale over which climate science dictates that greenhouse gas emissions must be reduced (80% by 2050) and the significant changes that must take place in the way that communities function: it is very difficult to plan over a timeframe of 40 years that involves changes that will affect every aspect of life in a community. A lot, however, is known about the changing future context and the emission reduction options—and communities can begin to make sense of these options by analysing future scenarios using quantitative and spatial tools. The policies and actions presented in this document were informed by quantitative energy and emission scenario modeling that was based on detailed community data across all sectors (see supplementary Technical Compendium for complete methodology and details).

3.1 Community Wide

Overview

The City of Coquitlam has an Official Community Plan and several neighbourhood and area plans that describe the shape the community will take over the next 20 years. Likewise, the City’s Strategic Transportation Plan is currently being updated and will guide the community over a similar time frame. The high level strategies and recommendations for GHG reduction targets, policies and actions were developed to align with current community priorities and to add a climate change lens to future decision making. As such, the Preferred Path that is described in the results from the modeling exercise and the recommended targets, policies and actions should not conflict with existing plans, but does recommend additional elements.

Preferred Path Emission Reductions

By pursuing the strategies described for each sector in the sections that follow, Coquitlam would be in a position to limit GHG emission growth to 4.8% above 2007 levels in 2021, and reduce emissions 14.2% below 2007 levels in 2031, and 33.1% below 2007 levels in 2051. On a per-capita basis, the emissions reductions would be greater—29% in 2021, 52% in 2031 and 66% in 2051.

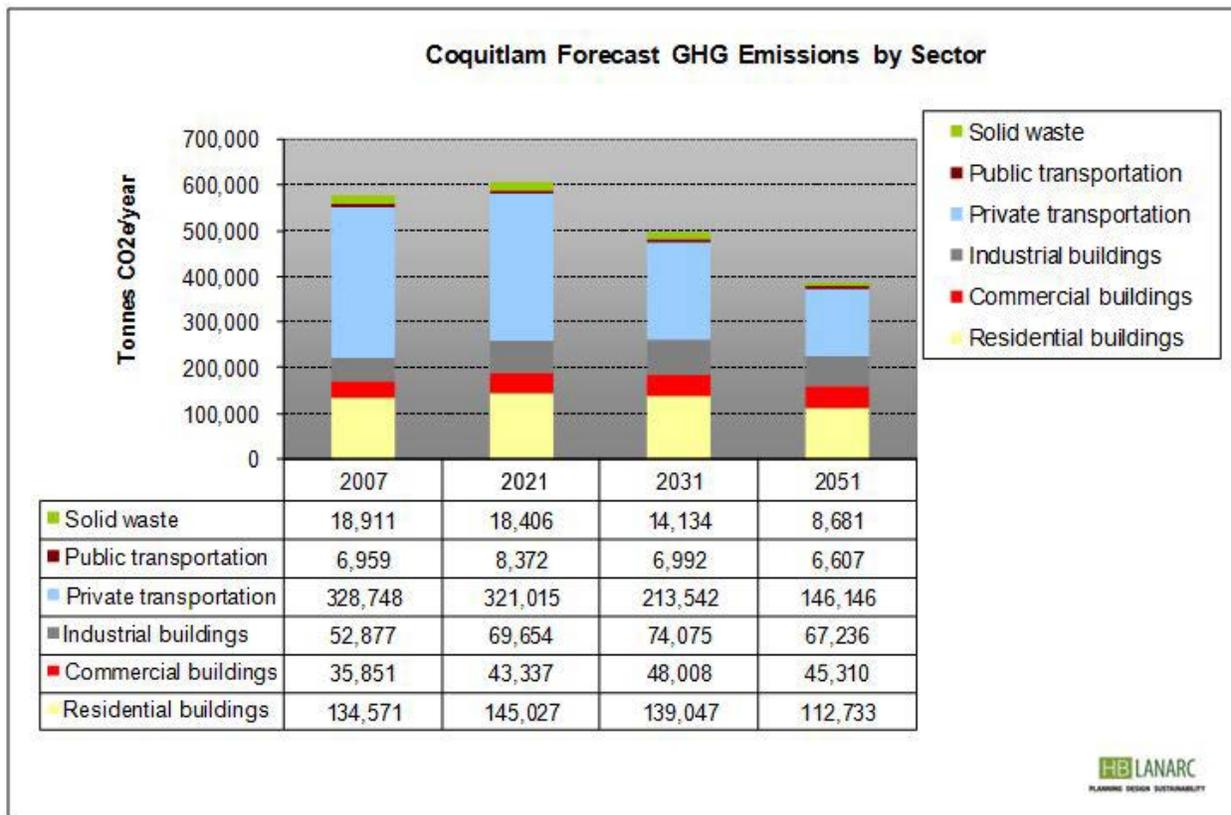


Figure 6 – Coquitlam Forecasted Greenhouse Gas Emissions by Sector²²

²² 2007 emissions in the table differ from the 2007 baseline numbers for some sectors due to the availability of data sources and model assumptions.

Table 4 – Modeled GHG Emissions in Coquitlam, 2007-2050

Low Carbon Path	Annual Emissions – Tonnes CO ₂ e/yr			
	2007 ²³	2021	2031	2051
Residential buildings	134,571	145,027	139,047	112,733
Commercial buildings	35,851	43,337	48,008	45,310
Industrial buildings	52,877	69,654	74,075	67,236
Total buildings	223,299	258,018	261,130	225,278
Total buildings per capita	1.88	1.48	1.24	0.97
Private transportation	328,748	321,015	213,542	146,146
Public transportation	6,959	8,372	6,992	6,607
Total transportation	335,707	329,386	220,534	152,752
Total transportation per capita	2.82	1.88	1.04	0.65
Solid waste	18,911	18,406	14,134	8,681
Solid waste per capita	0.16	0.11	0.07	0.04
Community Total	577,916	605,811	495,797	386,712
Total change over baseline (tonnes)	0	27,895	-82,118	-191,204
Total change over baseline (%)	0.0%	4.8%	-14.2%	-33.1%
Total per capita	4.86	3.46	2.35	1.66
Per capita change over baseline (tonnes)	0.00	-1.39	-2.51	-3.20
Per capita change over baseline	0.0%	-28.7%	-51.6%	-65.9%

On a sector-by-sector basis (see Figure 6 and Table 4), greenhouse gas emissions increase slightly between the present and 2021, as Coquitlam’s population is expected to grow at an annual rate of 2.6% in this time period, and many of the policies and actions put in place have not had a chance to extend their reach through the entire community. After 2021, emissions decrease at a faster rate in all sectors except for commercial and industrial buildings, which are not expected to experience the same levels of energy efficiency improvements through building code changes in comparison to the residential sector.

²³ 2007 emissions in the table differ from the 2007 baseline numbers presented in Part 2 for some sectors due to the availability of data sources and model assumptions.

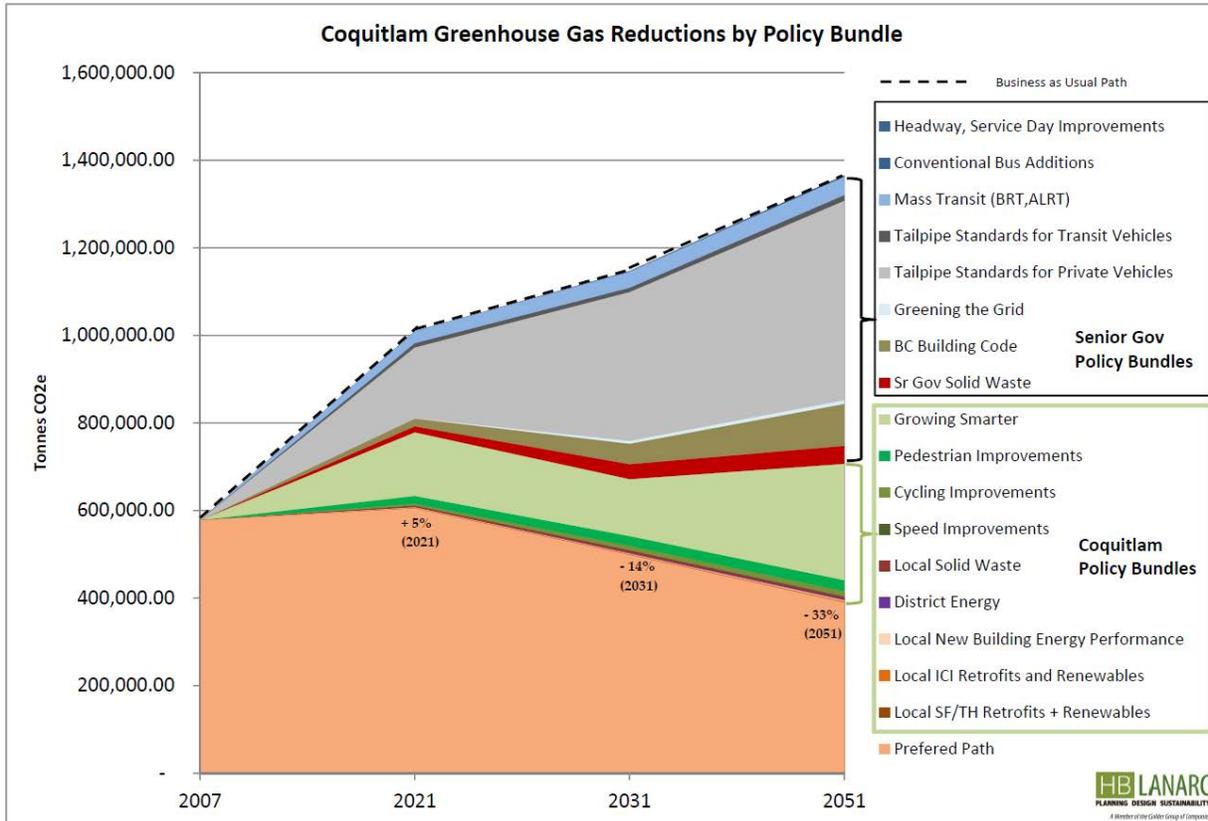


Figure 7 – Coquitlam GHG Reductions by Policy Wedge

Forty-three percent of the modeled emission reductions in 2021 and 32% in 2051 occur as a result of policies and actions enacted by the City of Coquitlam. The remainder are most directly connected to policies and actions that need to be instituted at the regional, provincial, or federal levels of government. **Figure 7** illustrates emission reductions by policy wedge below the Business as Usual (BAU)²⁴ path for Coquitlam, while *Table 5* and *Table 6* list the quantitative reductions for each wedge. The magnitude of the reductions as a result of Coquitlam policies and actions changes as time goes forward depending on anticipated growth and the phasing in of strategies. Implementation of policies and actions over the next 10 years will be critical to lay the groundwork for deeper emission reductions in later years.

It is important to note that the emission reductions listed in *Table 5* and *Table 6* as attributable to local and senior government policies are often co-dependent, with one impossible without another. The land use densification and increase in diversity of uses that is included in Growing Smarter, are closely connected to Pedestrian Improvements (more and increased density of sidewalks), Cycling Improvements (more bike lanes and dedicated pathways) and the local and senior government public transit related policy wedges.

²⁴ The Business as Usual (BAU) path represents a modeled version of the future emissions course that the city would take if none of the local or senior government actions described in this Strategy were implemented. Conceptually, the BAU path is similar to the Simple Growth path described earlier, with the primary difference being the calculation methods used. Simple Growth is based on historic trends and primarily determined by population growth, while the BAU path was created using the full range of model variables and inputs.

Table 5

Annual Emissions Reductions by <i>Local Policy Wedge</i> below BAU Forecast (Tonnes CO ₂ e)									
	SF/TH Retrofits + Renewables	ICI Retrofits + Renewables	New Building Energy Performance	District Energy	Local Solid Waste	Transit Speed	Cycling	Pedestrian	Growing Smarter
2021	79	1,294	860	0	3,481	85	4,633	17,829	145,012
2031	89	1,810	903	1,233	5,701	226	10,221	22,292	129,950
2051	70	2,295	2,220	2,072	5,906	587	12,249	25,448	265,456

Table 6

Annual Emissions Reductions by <i>Senior Gov Policy Wedge</i> below BAU Forecast (Tonnes CO ₂ e)								
	Sr Gov Solid Waste	BC Building Code	Greening the Grid	Tailpipe Private	Tailpipe Transit	Mass Transit (BRT, ALRT)	Conventional Bus Additions	Headway, Service Day Improvements
2021	13,926	17,860	603	161,559	9,822	27,663	37	434
2031	34,204	46,847	6,459	339,927	9,822	36,629	1,055	952
2051	41,345	95,660	8,517	455,311	13,019	41,987	1,616	2,395

Community-Wide Targets

Based on the analysis conducted and input from the engagement process, the City of Coquitlam has adopted the following community greenhouse gas reduction targets:

- Reduce total annual GHG emissions 15% below 2007 levels by 2031; and,
- Reduce per-capita annual GHG emissions 30% below 2007 levels by 2021.

These numbers are conservative estimates of the emission reductions that the City of Coquitlam could achieve if the modeled strategies are implemented.

Energy and Carbon Cost Savings

One of the most compelling arguments for taking action to reduce energy use and greenhouse gas emissions is the short and long term cost avoidance that is possible. Rising energy costs due to decreasing and unreliable supply of fossil energy and the construction of new energy infrastructure will be major drivers of change and could impose a significant increased financial burden on local governments, businesses and individuals if pre-emptive action is not taken. To illustrate this point, the expenditures on energy use and carbon have been quantified under a business as usual and the preferred path scenario. Detailed methods on the energy price forecasts and expenditure quantification can be found in the supplementary Technical Compendium

In 2007, the estimated total expenditure on energy in the community was \$274 million, or \$5,000 per household for residential energy use (including household utility and personal travel expenses). Under the simple growth scenario, expenditures on energy and carbon would increase to \$634 million (\$7,600 per household) in 2021, \$880 million (\$8,500 per household) in 2031, and \$1.5 billion (\$11,300 per household) in 2051. The energy savings under the modeled Preferred Path set of policies and actions would be immense over this Simple Growth scenario, as illustrated in **Figure 8** and **Figure 9**. In 2051 energy expenditures under the Preferred Path scenario would total \$525 million, approximately one-third of the Simple Growth scenario.

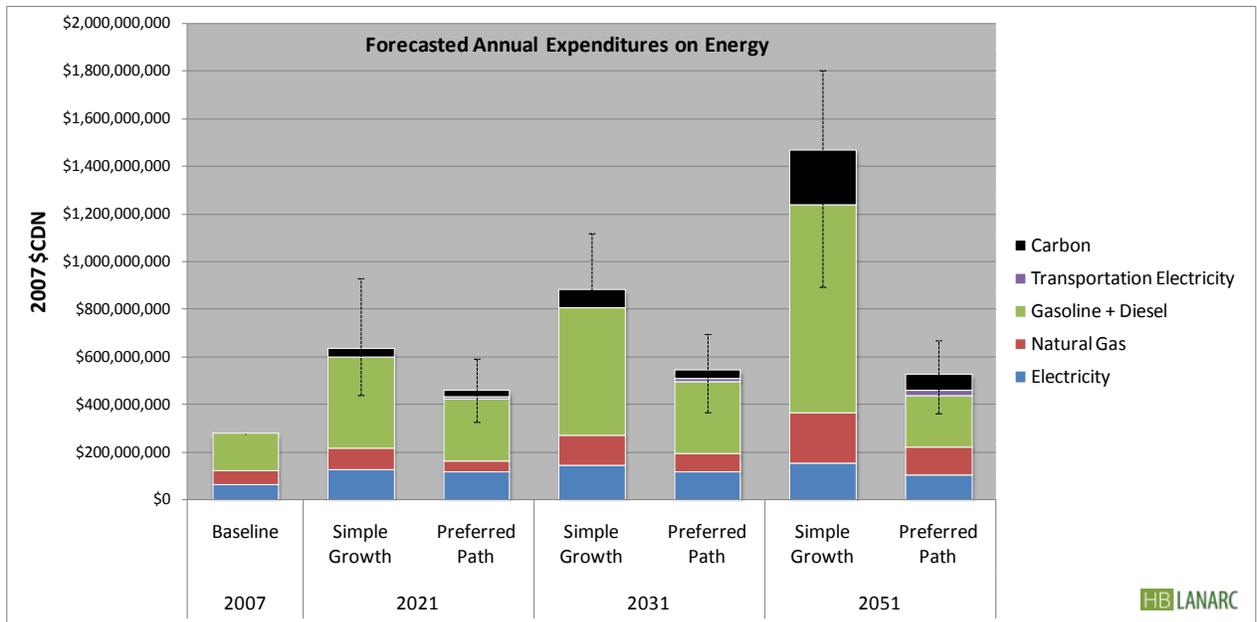


Figure 8 – Forecasted Expenditures on Energy and Carbon in Coquitlam. Error bars correspond to low and high estimates for price forecasts for gasoline/diesel, natural gas and the price of carbon and correspond to total expenditures for each sector. Carbon expenditures are for gasoline and diesel used in private vehicles and public transit and the use of natural gas in buildings. The “carbon” expenditure estimates in this figure are based on the assumption that future monetization of carbon— whether it is a cap-and-trade system, carbon tax, or a hybrid system—will be passed on to the consumer and embedded in the price of energy.

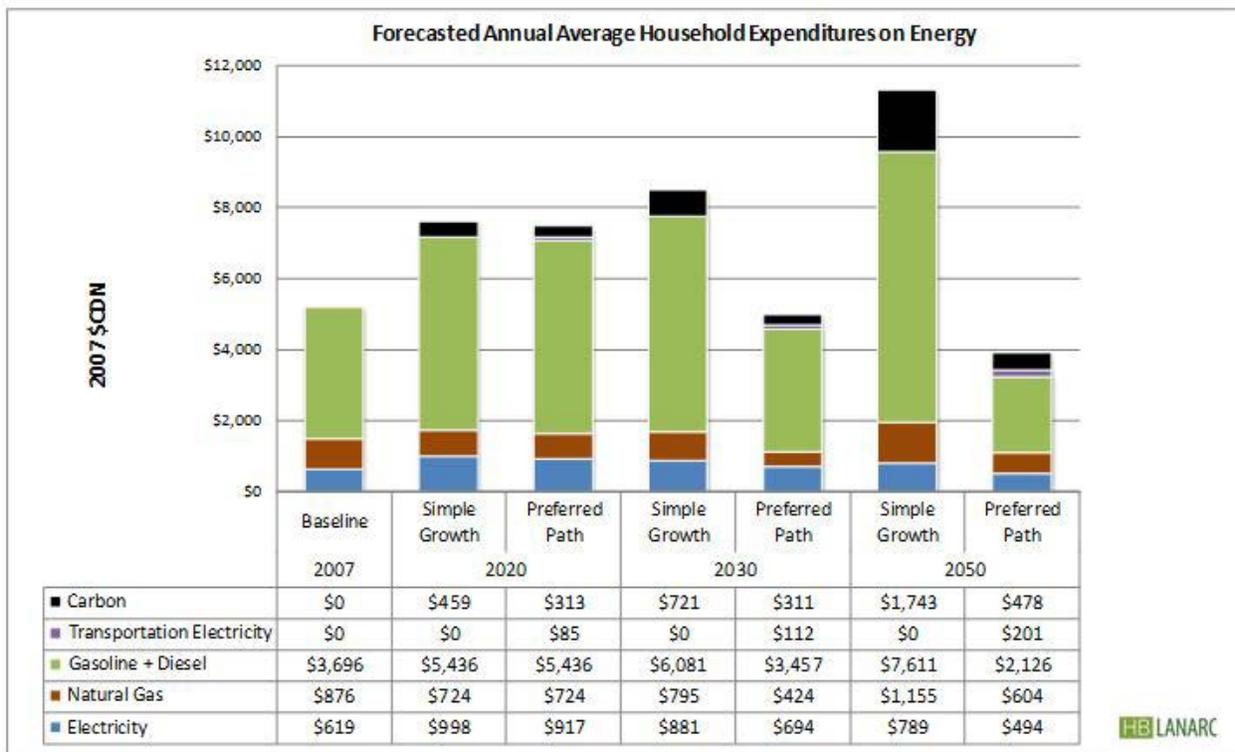


Figure 9 – Forecasted Expenditures on Energy Use, per Coquitlam Household. Carbon expenditures are for gasoline and diesel used in private vehicles and public transit and the use of natural gas in buildings. The “carbon” expenditure estimates in this figure are based on the assumption that future monetization of carbon— whether it is a cap-and-trade system, carbon tax, or a hybrid system—will be passed on to the consumer and embedded in the price of energy.

3.2 Land Use

The foundation for community energy and emissions planning is the existing and planned land use patterns. The policies and actions in this section build from the extensive city and neighbourhood planning that has taken place recently and is ongoing in Coquitlam, with an emphasis on mixed use development around neighbourhood centres and creating connections among these centres and with transit.

Future Land Use Planning Context

The analysis and planning that took place as a part of this project was informed by a number of assumptions about future land use in the community, as influenced by external factors and other City planning areas and priorities. These assumptions include:

- Population and jobs will grow at rates consistent with the Metro Vancouver Regional Growth Strategy projections;
- Future growth will be accommodated primarily through a nodal growth pattern in accordance with land uses and densities envisioned in the CWOCP – higher density mixed-use in City Centre and Neighbourhood Centres. Northeast Coquitlam will build-out as planned;
- Future land use changes associated with on-going or phased planning processes (City Centre, Maillardville, Partington Creek).
- Over the longer term, low density CWOCP designated neighbourhood centres will redevelop as more walkable mixed-use neighbourhood centres, or expand beyond the currently designated core (e.g. Como Lake Village, Austin/Mariner, Burquitlam);
- Future regulatory changes will allow broader opportunities for new housing choices in Southwest Coquitlam’s lower density neighbourhoods;
- Future construction of a Falcon Street ALRT station would be supported by the City of Coquitlam through a Station Area Planning process that explores transit oriented land uses and densities; and,
- Future direct and frequent transit service (possibly rapid transit) along the Lougheed Corridor would be supported by concentrated residential growth around station/stop areas. This considers connections between City Centre and south of Fraser, as supported by Strategic Transportation Plan (STP) analysis (2011).²⁵



A conceptual diagram from the 2008 Coquitlam City Centre Area Plan update process.

The “growing smarter” land use responses identified in this section, which include the future transition of Coquitlam City Centre, will result in significant GHG emission reductions below the business-as-usual forecast. In 2021 citywide reductions are estimated at approximately 145,000 tonnes CO₂e and approximately 265,500 tonnes CO₂e for 2051.

²⁵ While this is consistent with recent analysis for the City’s update to the Strategic Transportation Plan update (2011), 2010 modeling to set GHG targets assumed this service along the entire Lougheed Corridor post 2031 (consistent with the conceptual alignment illustrated in Translink’s Transport 2040 document).

Goals

As a reflection of the broad reaching impact of land use policies in the City, the land use goals focus on community sustainability, not just energy and emissions. The goals are:

- Increase the percentage of complete, compact design in new and existing neighbourhoods to reduce travel distance and frequency of vehicle trips;
- Establish a built form and mix of uses that supports liveability and healthy lifestyles; and,
- Foster urban development that encourages efficient use of existing and planned infrastructure.

Land Use Actions

The following actions emerged from the stakeholder engagement and analysis process as those that will help the City achieve emission reductions while also meeting complementary community goals and priorities developed through other planning processes. These strategies should be the basis for developing more detailed policies and actions.

- A. In consultation with the community, explore the longer term transition of low density neighbourhood commercial centres to vibrant, walkable mixed-use nodes. To improve access to daily needs for Coquitlam residents, also give consideration to strategically extending existing commercial centres or establishing new ones, scaled to the neighbourhood context.
- B. Explore, in consultation with the community, broader opportunities for facilitating new housing choices in Southwest Coquitlam's lower density neighbourhoods. Continue to encourage Secondary Suites and Infill Cottages for their inherent superior energy performance.
- C. Continue to support, in consultation with the community, further transition of the City Centre to a highly urban and vibrant downtown with a mix of land uses and employment opportunities.
- D. Support integration of the planned Evergreen Rapid Transit Line through station area planning that considers transit oriented land uses and densities.
- E. Support future direct, frequent transit services between City Centre and communities south of Fraser via the Lougheed corridor with transit supportive land uses around stops in the longer term.
- F. Focus the majority of growth within 800 metres of high frequency transit service.
- G. Explore opportunities to integrate more live/work uses throughout the City.
- H. Explore implementation tools to provide greater opportunities for smaller format commercial offices in neighbourhood centres to encourage and support small businesses.
- I. Create opportunities for a diversity of service and entertainment destinations in neighbourhood centres.

Live-Work Buildings

Small format office space for professional services is in short supply in Coquitlam. During consultation for the Greenhouse Gas Reduction Strategy and previous City projects, members of the public have commented on the lack of small format office space in the City. Zoning for live-work buildings in neighbourhood centres and City Centre would allow residents to establish offices closer to home, and in some cases in the same building.

Live-work units are based on the traditional downtown living arrangement — shopkeepers operated their businesses on the lower levels of a building while living in apartments above.

Live-work buildings would be one part of the complete, 20 minute neighbourhood planning initiative to co-locate homes, essential services and places of work. In 2007, the International Code Council approved changes to the building code that allowed live/work units to be built as residential units instead of commercial buildings.

Neighbourhood Grocery Stores

Neighbourhood grocery stores are on the front lines of combating climate change. One in five trips is for shopping. In Coquitlam, like most North American cities, it is common for residential neighbourhoods to lack stores or shops where residents can go to meet their daily needs. Car-oriented retail outlets are often the only options for shopping. People who live near small stores walk more for errands and, when they do drive, their trips are shorter. Moreover, the presence of small retailers influences the likelihood that people take public transit because they are able to chain errands on their commute home. Living close to grocery stores and even restaurant outlets also lowers the likelihood of obesity. A small, but growing number of jurisdictions are establishing policies to promote neighbourhood grocery stores for the wide variety of social economic and environmental gains.

Obesity linked to fewer neighbourhood food options <http://www.unews.utah.edu/p/?r=102609-2>

Neighbourhood Grocery Stores and the Fight Against Global Warming <http://www.newrules.org/retail/article/neighborhood-stores-overlooked-strategy-fighting-global-warming>

Complete Streets and Walking

In Metro Vancouver, 65% of trips occur for non-commuting purposes, with recreation/dining/shopping (30%) and personal business/errands (22%) accounting for the majority.¹ Designing neighbourhoods so that the majority of residents are within convenient walking distance to complete streets—places where you can find grocery stores and shops, community centres and libraries, and restaurants/cafes. Neighbourhoods that contain complete streets have a significantly higher percentage of walking trips than those that do not, which also contributes to reducing greenhouse gas emissions.

Currently in Coquitlam, the vast majority of the non-work destinations are located in the City Centre and the neighbourhood centres. In order to get a sense for how many people are within walking distance of the City Centre and neighbourhood centres, Figure 10 was created. The areas in dark green are the neighbourhood centres, with the light green zones surrounding them representing areas that are within a 10 one-way, or 20-minute return walking trip to the neighbourhood centre. To increase the walking mode share in Coquitlam, increasing the number and distribution of complete streets should be a cornerstone of City policy.

¹ Metro Vancouver and Translink 2004, Trip Survey.

Twenty Minute Neighbourhood Planning

The “20 minute neighbourhood” is a planning concept that includes integrated land use, transportation and development planning that makes it possible for city residents to meet a majority of their needs within a 20 minute round-trip walking distance from their home. Such neighbourhoods are recognized as highly liveable and safe. They are characterised by three features:

- Infrastructure and design that makes walking safe and enjoyable
- Access to key destinations such as shops, jobs, and parks
- Compact residential form to ensure the success of commercial key destinations

As part of Portland’s (Oregon) continuing commitment to reduce GHGs, the City is planning to ensure all residents live in “20 minute neighbourhoods.” Context is critical in planning and designing such complete neighbourhoods. The scale and type of key destinations will be different in predominantly residential areas versus higher density, mixed use areas. The Neighbourhood Vitality and GHG Reduction Approaches, in Section 4, begin to address these unique opportunities.

Portland Plan: Status Report: Twenty-Minute Neighborhoods
<http://www.portlandonline.com/portlandplan/index.cfm?a=246917&c=46822>

Key Land Use Indicators

The indicators below illustrate the potential impact of land use actions described in this section and assist in monitoring long term progress. By prioritising mixed-use development in neighbourhood centres and locating the majority of future growth close to the rapid transit network, a larger percentage of residents will be able to carry out their daily trips using sustainable transportation modes.

Indicator	Description	2007 (Base Year)	2051 Preferred Path
Dwellings within a 10 minute walk to commercial services	When residents live close to food stores, shopping, cafes, the yoga studio and dentist, for example, more sustainable transportation options become viable options. Data Source: City GIS data	26%	50%
Dwellings within a 10 minute walk to rapid transit	Concentrating growth around rapid transit stops is an effective strategy for increasing transit mode share and reducing transportation sector emissions. Data Source: City GIS data	<1%	25%
Ratio of Local Jobs to Local Workers	As the diversity of uses in neighbourhoods increases, more residents will have the opportunity to work close to where they live. Data Source: Census Community Profile	0.5	0.79
Residential Density	Increasing residential densities is known to reduce vehicle use resulting in fewer transportation-related GHG emissions. Population/Land within 2007 Urban Growth Boundary. (UGB ~5,900 ha in 2007) Data Source: City GIS	~20 people/ha	~37 people/ha (2041)

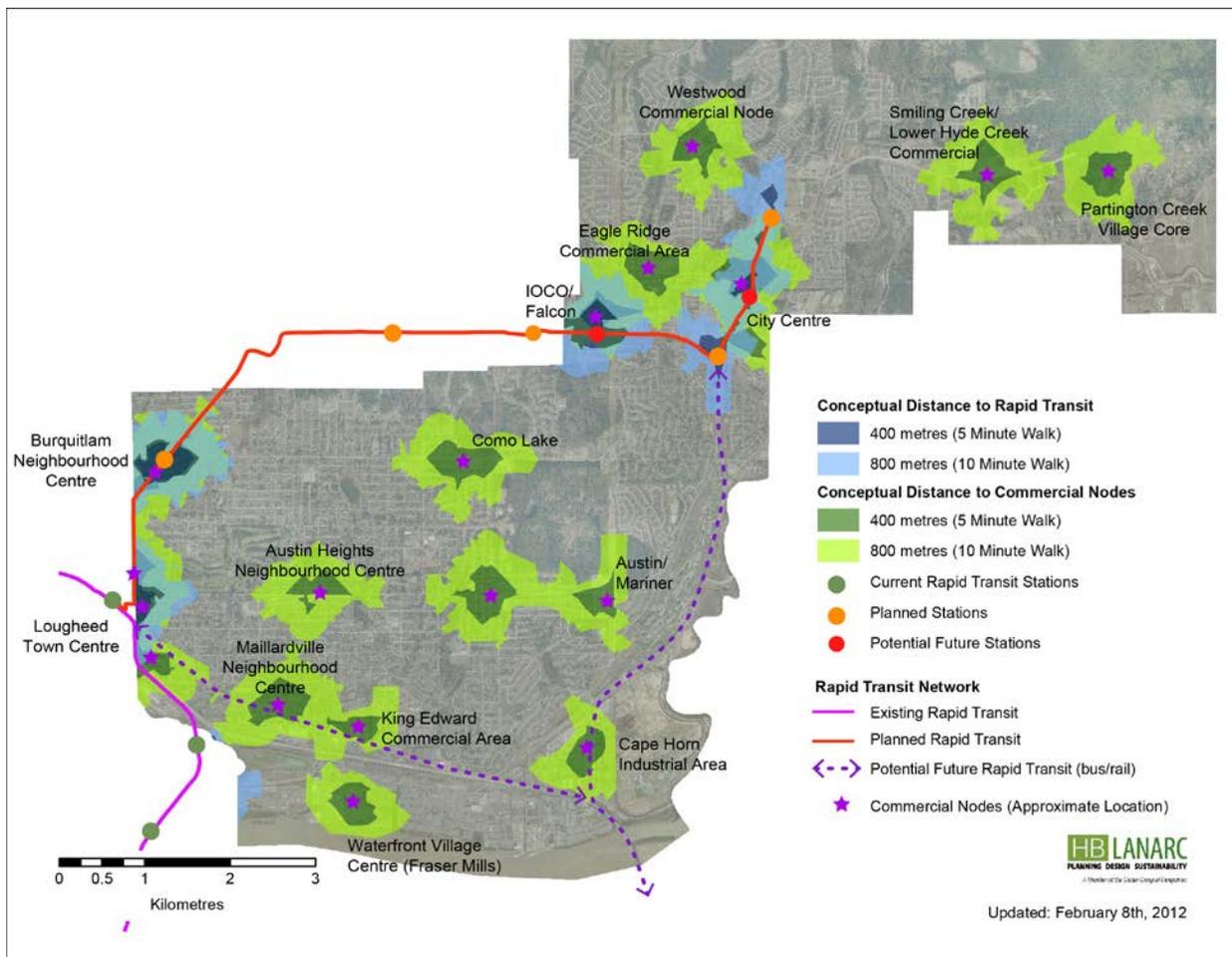


Figure 10 – Coquitlam Pedestrian Walkshed Map 2031. Distance and walking times to rapid transit and commercial nodes consider both planned and conceptual long term rapid transit elements.

Original modeling for the Community GHG Strategy (2010) assumed rapid transit service along the Lougheed corridor, as conceptually illustrated in TransLink’s Transport 2040, with implementation in 2031. Subsequent Strategic Transportation Plan analysis (2011) determined that potential rapid transit service connecting City Centre with south of Fraser could be supported within the 2031 outlook of the STP Update. Feasibility of an east-west Lougheed rapid transit route would need to be evaluated through future transportation planning initiatives and would require a supporting land use response.

3.3 Transportation

The goals and actions in this section are oriented towards helping residents choose lower carbon transportation modes and supplementing more detailed planning initiatives (the Strategic Transportation Plan) and complementing the land use policies and actions in this Strategy and in the City's Official Community Plan and neighbourhood plans.

Future Transportation Planning Context

The analysis and planning that took place as a part of this project was informed by a number of assumptions about future transportation infrastructure, policy and individual travel decisions/patterns in the community, as influenced by external factors and other City planning areas and priorities. In the short and medium term, the recommendations and policy decisions that are made as a part of the Strategic Transportation Plan Update will be particularly influential and important. Assumptions considered for this Strategy include:

- Evergreen Rapid Transit Line will be implemented by 2014 (assumption at time of analysis); actual timing revised to 2016 (Province).
- Provincial tail-pipe emission standards will evolve to align with California Standards (BC Provincial Government Action).
- New transit service will be implemented at a modest rate -- enhancement of existing bus routes; implementation of new bus routes, and longer term frequent transit connections between City Centre and south of Fraser via the Lougheed corridor (TransLink).²⁶
- New cycling and pedestrian facilities will be implemented at a steady rate.

Goals

The transportation goals developed through the Strategy process are focused both on the efficient and low carbon movement of people, and increasing liveability in the City. The goals are:

- Create street/road designs and parking standards that promote active transportation (walking/cycling) and public transit use;
- Reduce overall expenditures on energy in the transportation sector;
- Mitigate increases in travel time caused by single occupancy vehicle congestion through greater transportation choice;
- Reduce the annual per capita vehicle kilometres traveled through greater transportation choice, compact complete communities, and local employment;
- Support major rapid transit lines to facilitate efficient transportation to, from and within the City;
- Support Provincial efforts to improve vehicle efficiency through means within municipal authority.

²⁶ While this is consistent with recent analysis for the City's update to the Strategic Transportation Plan (2011), modeling to set GHG targets (2010) assumed rapid transit service (bus/rail) along the entire Lougheed Corridor post 2031 (consistent with the conceptual alignment illustrated in Translink's Transport 2040).

Transportation Actions

A process to update Coquitlam's Strategic Transportation Plan was ongoing at the time of writing this Strategy, and therefore formation of specific policy and action recommendations in the transportation sector were kept at a high level pending the more detailed recommendations of the Transportation Plan Update. Transportation strategies include:

- A. Support continued and steady implementation of new cycling and pedestrian facilities in coordination with the Strategic Transportation Plan, as amended.
- B. Work with transit planning/operational authorities to implement priority measures that support transit throughout the City, in coordination with the Strategic Transportation Plan and Neighbourhood Plans, as amended (e.g. support for frequent transit network service, separate bus lanes, signal systems, queue jumpers).
- C. Increase walking and cycling connectivity and infrastructure at the neighbourhood scale, beginning with the City Centre.

Further Actions for Deeper GHG Reductions

A number of innovative policy and action options that were discussed during the formation of the Reduction Strategy were not able to be quantitatively modeled. These include:

- Promote, and where possible invest in transportation demand management (TDM) measures in new developments and in neighbourhood centres and the City Centre (e.g. car sharing, bike end-of-trip facilities, telecommuting, parking management).
- Explore the development of policies to support low emission vehicles – hybrids, plug-in electric, full electric vehicles, electric scooters (e.g. dedicated premium parking, vehicle charging stations).
- Policies and actions to support low emission vehicles. This could include:
 - Entering into a partnership with a company to install vehicle charging stations in public and commercial parking spaces; and,
 - Implementing design guidelines for charging stations in single-family, attached and multi-unit residential homes;
- Work with key partners to promote education & outreach programs to support sustainable transportation – walking, cycling and transit (e.g. TransLink Travel Smart Program).

The Evergreen SkyTrain Line

Residents, businesses and the City alike have long supported TransLink and BC Provincial Government plans to build the Evergreen rapid transit line, which is planned to extend to Coquitlam City Centre. The line, which will take four years to construct, is slated to have stations at Burquitlam, Coquitlam Transit Exchange and Douglas College, with efforts underway to include a 4th in the vicinity of Lincoln Avenue. The Evergreen Line signifies an opportunity to greatly increase the convenience and comfort of transit commuting and the major piece of transit infrastructure around which the City's vision for its downtown plan can be built and realised.

The mapping analysis conducted as a part of the Community GHG Reduction Strategy provided the opportunity to quantitatively analyse the potential greenhouse gas emission impact of the Evergreen Line. The analysis showed that construction of the Evergreen Line and the complementary increase in homes, jobs and services following "Smart Growth" principles around the three new Evergreen Line stations and the improvement in connecting transit services, bike path and pedestrian network will result in an approximate 5-10% reduction in total community emissions. This is five to ten times higher than if the Evergreen Line alone was constructed, without the surrounding land use and service improvements.

Key Transportation Indicators

The indicators below assist in monitoring progress for transportation related actions set out in this section. By prioritising mixed-use development in neighbourhood centres and locating the majority of future growth close to the rapid transit network, a larger percentage of residents will be able to carry out their daily trips using sustainable transportation modes.

Indicator	Description	Base Year	Preferred Path																		
<p>Mode Split for All Trips</p> <p>*Revised to align with Strategic Transportation Plan (STP) analysis, 2011</p>	<p>An important measure of progress is consideration of transportation mode split for all trips taken by Coquitlam residents. A higher percentage of trips made by walking, cycling and transit is a good indicator of decreasing transportation sector emissions.</p> <p>Data Source: TransLink Metro Vancouver Trip Survey (2008)</p>	<p>2008*</p> <table> <tr> <td>Auto</td> <td>82%</td> </tr> <tr> <td>Transit</td> <td>9%</td> </tr> <tr> <td>Bike</td> <td>0.2%</td> </tr> <tr> <td>Walk</td> <td>8%</td> </tr> <tr> <td>Other</td> <td>1.1%</td> </tr> </table>	Auto	82%	Transit	9%	Bike	0.2%	Walk	8%	Other	1.1%	<p>2031 (STP)*</p> <table> <tr> <td>Auto</td> <td>70%</td> </tr> <tr> <td>Transit</td> <td>15%</td> </tr> <tr> <td>Bike</td> <td>3%</td> </tr> <tr> <td>Walk</td> <td>12%</td> </tr> </table>	Auto	70%	Transit	15%	Bike	3%	Walk	12%
Auto	82%																				
Transit	9%																				
Bike	0.2%																				
Walk	8%																				
Other	1.1%																				
Auto	70%																				
Transit	15%																				
Bike	3%																				
Walk	12%																				
<p>GHG emissions per household resulting from personal vehicle travel</p>	<p>Total residential transportation emissions are averaged at the household level and reported in tonnes of carbon dioxide-equivalent units. This indicator is a reflection of annual VKT, mode split, and the efficiency of vehicles.</p> <p>Data Source: CEEI report</p>	<p>2007 6.2 tonnes CO₂e</p>	<p>2031 2.60 tonnes CO₂e</p>																		
<p>Sustainable Network Development</p> <p>*Revised to align with Strategic Transportation Plan (STP) analysis, 2011</p>	<p>Providing residents and workers with infrastructure that increases the safety and comfort for pedestrians, cyclists and transit users will facilitate mode shift.</p> <p>Data Source: Engineering & Public Works</p>	<p>2007*</p> <table> <tr> <td>Sidewalk/Paths</td> <td>457 km</td> </tr> <tr> <td>Bicycle Routes</td> <td>15 km</td> </tr> <tr> <td>Frequent Transit Routes</td> <td>6.2 km</td> </tr> </table>	Sidewalk/Paths	457 km	Bicycle Routes	15 km	Frequent Transit Routes	6.2 km	<p>2031 (STP)*</p> <table> <tr> <td>Sidewalks/Paths</td> <td>700 km</td> </tr> <tr> <td>Bicycle Routes</td> <td>150 km</td> </tr> <tr> <td>Frequent Transit Routes</td> <td>27 km</td> </tr> </table>	Sidewalks/Paths	700 km	Bicycle Routes	150 km	Frequent Transit Routes	27 km						
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Bicycle Routes	150 km																				
Frequent Transit Routes	27 km																				
<p>Annual Vehicle Kilometres Traveled (VKT) per Household</p>	<p>A measure of how much residents drive in one year averaged at the household level.</p> <p>Data Source: CEEI report</p>	<p>2007 ~21,800 KM per household</p>																			

3.4 Buildings

Buildings goals and actions were designed to complement those that are in the Land Use sector, to prepare the City and developers for near term changes in the building code, and equip residents and businesses with information and resources needed to improve the energy performance of their buildings.

Future Buildings Planning Context

The analysis and planning that took place as a part of this project was informed by a number of assumptions about future building practices, and policy, as influenced by external factors and other City planning areas and priorities. In particular, future changes to the BC Building Code will have a significant impact. These assumptions include:

- BC Building Code improvements will improve energy efficiency requirements and the use of building scale renewable energy technologies to meet heating needs (BC Provincial Government); and,
- Growth patterns will result in a high increase in multi-unit residential and mixed-use development.

Goals

The buildings sector goals intersect with a wide spectrum of liveability and sustainability priorities. The goals are:

- Improve the energy efficiency of *new* and *existing* residential, and commercial/institutional buildings;
- Promote renewable energy in *new* and *existing* residential, commercial/institutional buildings;
- Strengthen per capita and per unit energy and emission performance through consideration of building/dwelling types and unit sizes (i.e. high efficiency multi-unit buildings, smaller unit sizes, suites);
- Reduce overall expenditures on energy for City residents and businesses; and,
- Build on the City's commitment to housing diversity to promote access and support opportunities for aging in place.



Mixed-use, high performance building concept. Image reproduced courtesy of D'Ambrosio Architecture + Urbanism.

Energy Efficiency Financing for Small and Large Businesses

The BC Hydro Power Smart program offers financial incentives for small and large businesses, institutions and organisations for the purchase of a large range of energy efficient equipment. For smaller customers, there is the Product Incentive Program. Large customers that have been assigned a Key Account Manager are able to apply online and receive immediate approval. BC Hydro also utilises a tiered incentive program that offers financing that reflects energy savings and payback periods.

Buildings Actions

The following strategies emerged from the stakeholder engagement and analysis process as those that will help the City achieve emission reductions. These strategies should be the basis for developing more detailed policies and actions.

- A. Continue to support a high increase in multi-unit residential and mixed use development.
- B. Explore strategic outreach and education opportunities to encourage building owners and users to reduce energy use and solid waste, and invest in renewable on-site energy (commercial, institutional, light industrial and residential).
- C. Explore opportunities for strategic outreach and education for developers, realtors and other stakeholders to promote energy efficiency, passive design and renewable energy technologies and practices.
- D. Explore market-sensitive land use tools to encourage higher performance buildings, passive design and renewable energy (e.g. development permit areas, streamlining approval of permits, rezoning, development cost charge considerations).

There are numerous capacity building, financial, voluntary and regulatory tools at the disposal of local governments to advance green building and energy efficient building practices in their communities. Appendix B – Green Building Tools and Opportunities, contains a table of resources for each of these types of tools and a flow-chart that maps the barriers and opportunities at different stages in the pre-application and application process.

Supplementary and Further Actions for Deeper GHG Reductions

A number of innovative policy and action options that were discussed during the formation of the Strategy were not able to be quantitatively modeled. The following actions were identified as opportunities for furthering reductions beyond those that will be achieved by the modeled actions.

- Identify building types that could be more appropriate for certain renewable and energy efficiency technologies, (e.g. geo-exchange in townhouses and single family).
- Encourage the Provincial government to increase the number of new single family developments that incorporate onsite renewable energy technologies through BC Building Code changes.

BC Building Code – The Importance of Local Enforcement

The City is responsible for ensuring that buildings meet minimal BC Building Code requirements, including energy standards, as part of permitting and inspections.

As BC Code energy requirements are made more stringent, enforcing adherence to standards will require more resources. Future iterations of the BC Building Code may contain new mandatory performance measures, such as air leakage tests. These additional tools will assist the City to enforce the Code.

Key Buildings Indicators

The indicators below illustrate the potential impact of buildings actions described in this sector and assist in monitoring long term progress. Data availability is currently limited. Potential indicators have been identified to support future monitoring when data comes available.

Indicator	Description	2007 (Base Year)	2051 Preferred Path
Percentage of New Residential Development that is Multi-Unit Buildings	A key building action is to support an increase in multi-unit development (town homes, low and high-rise apartments). This indicator will be useful for tracking progress on the action. Data Source: Provincial CEEI report	Existing multi-unit residences: 53%	% of New Development 2007 – 2021: 84% 2021 – 2031: 82% 2031 – 2051: 93%
Potential Future Indicators, Pending Available Data			
Average Energy Use Intensity (kWh/sq metre/year)	As more efficient new buildings are constructed and existing buildings are retrofitted, the energy use intensity should steadily decrease. Data Source: Provincial CEEI Report (indicator under consideration)	Single Family 201 Townhome 182 Low Rise 173 High Rise 173 Commercial 550	Single Family 116 Townhome 78 Low Rise 104 High Rise 77 Commercial 326
Residential Building Energy Retrofits	The number of homes in the City that are being retrofitted for energy improvements is a good indicator of progress for reducing emissions from the existing building stock. Data Source: Accurate data source to be determined.	unknown	345 each year
Commercial Building Energy Retrofits	The number of businesses in the City that are being retrofitted for energy improvements is a good indicator of progress for reducing emissions from the existing building stock. Data Source: Accurate data source to be determined.	unknown	10 each year
Building Scale Renewables: New Buildings Phase in, 2020-2040 (% of new buildings, annual)*	% of newly constructed residential buildings which include a renewable energy system. Data Source: To be determined, pending implementation of City tracking mechanism.	unknown	By 2051: 14% of new buildings

* Includes Heat Pumps (air-source, geo-exchange), solar thermal, etc., many of which are already more economical for homeowners than conventional heating technologies

3.5 Energy Supply

With Coquitlam's plans for mixed use development and increased density of uses around neighbourhood and village centres, low carbon district energy presents the biggest opportunity for energy efficiency gains and GHG emission reductions in the energy supply sector.

Future Energy Supply Planning Context

The analysis and planning that took place as a part of this project was informed by a number of assumptions about future energy supply as influenced by external factors and other City planning areas and priorities. In particular, future changes to electricity generation in the Province and the BC Building Code will have a significant impact. These assumptions include:

- BC Hydro will reduce greenhouse gases from electricity production (BC Hydro and the Province); and,
- District energy will be implemented in Northeast Coquitlam Village Centre and Fraser Mills Waterfront Village by 2031 (City and Private Sector).

Goals

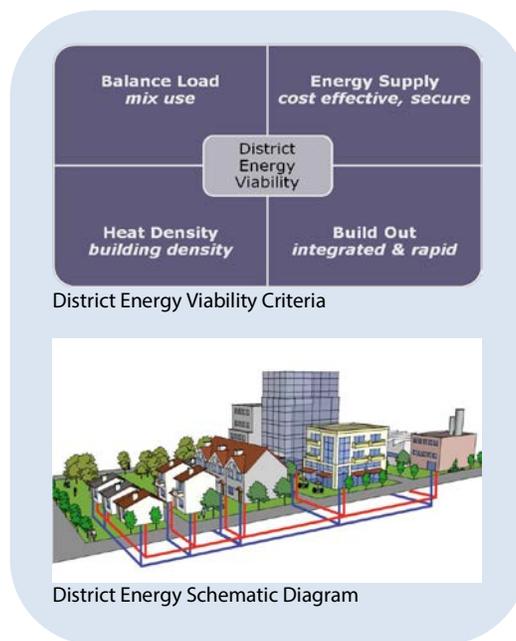
The energy supply goals developed through the strategy process focus on supply options that the City can influence. The two overarching goals are:

- Support development of low carbon district energy; and
- Support on-site, building scale renewable heat and electricity opportunities.

Energy Supply Actions

The following actions emerged from the stakeholder engagement and analysis process as those that will help the City achieve emission reductions. These actions should be the basis for developing more detailed policies and actions.

- A. Continue to encourage implementation of district energy in Northeast Coquitlam village Centre and Waterfront Village Centre (Fraser Mills)
- B. Explore potential opportunities for district energy systems in fast growing Coquitlam neighbourhood centres (both new and existing), and the City Centre.



District Energy Opportunities --> Coquitlam's Corporate Climate Action

Coquitlam's *Corporate Climate Action Plan 2007* identifies opportunities to integrate district energy systems or energy exchange systems in select civic precincts.

- » The City integrated a thermal energy exchange system as part of the new Poirier Sports and Leisure Complex, completed in 2010. This system transfers unused heat between the library, swimming pool and arena buildings, reducing both costs and GHG emissions.
- » Analysis is underway to understand potential opportunities for a district energy system to serve the City Centre Aquatic Centre, City Hall and Public Safety buildings, with potential expansion into the broader community in the longer term.

Moving forward, and where appropriate, the City should consider policy tools to encourage developers to construct buildings that connect to future district energy systems.

Supplementary and Further Actions for Deeper GHG Reductions

A number of innovative policy and action options that were discussed during the formation of the Reduction Strategy that were not able to be quantitatively modeled or serve as a supporting action to a higher level initiative. The following actions offer further opportunity to reduce GHG emissions beyond the modeled policies and actions:

- Explore the creation of service area bylaws for hydronic (radiant) heating and district energy connection ready buildings, where appropriate
- Develop education and promotion resources to encourage integration of renewable energy technologies in new single family dwellings.

District Energy Strategic Investments to Reduce Long Term GHG Emissions

A multi-pronged approach to emission reductions will be necessary if communities are to achieve meaningful reduction targets.

For individual buildings and clusters of buildings, district energy can deliver multiple benefits. Where a readily available source of waste heat is located in close proximity to a larger, higher density and diverse heat demand (e.g. mixed-use), district energy will often make sense from an energy efficiency, GHG reduction and cost perspective. Using fuel sources that are less carbon intensive than natural gas will further reduce emissions beyond what is possible with expansion of a district energy system alone. Finding a locally available low carbon fuel source will also have the co-benefit of increasing energy security and reducing vulnerability to energy price volatility.

Key Energy Supply Indicators

The indicators below illustrate the impact of energy supply actions described in this section and assist in monitoring long term progress.

Indicator	Description	2007 (Base Year)	Preferred Path	
Building Area connected to District Energy	The most direct measure of the success of local district energy promotion and system expansion is the floor space of residential and commercial buildings that are connected. <i>Data Source: Building Permits</i>	0 m ²	2031	333,100 m ² 2051 436,800 m ²
District Energy Emission Factor	The incorporation of low and zero carbon energy sources into district heating and cooling systems should be part of all district energy implementation plans. The greenhouse gas intensity of district energy systems is a good indicator if they are contributing to community-wide emission reduction goals. <i>Data Source: District energy system operator(s)</i>	Not applicable	2031	83 g CO ₂ e/kWh 2051 37 g CO ₂ e/kWh

3.6 Solid Waste

Regional initiatives to increase the rate of recycling and composting most directly influence the goals and actions in the Solid Waste sector, which are based on zero waste principles.

Future Solid Waste Planning Context

The analysis and planning that took place as a part of this project was informed by a number of assumptions about future solid waste management as influenced by external factors and other City planning areas and priorities. In particular, regional government solid waste management activities and goals will have a significant impact. These assumptions include:

- Metro Vancouver will implement programs associated with the Zero Waste initiative (Metro Vancouver with City Support).
- The City will implement programs to increase recycling and diversion of organics.

Goals

An overarching goal for the solid waste sector that encompasses the range of actions is to:

- Annually reduce waste generation and increase waste diversion in striving to achieve Zero Waste.

Solid Waste Actions

The following actions emerged from the stakeholder engagement and analysis process as those that will help the City achieve emission reductions. These actions should be the basis for developing more detailed policies and actions.

- A. Support Metro Vancouver efforts to increase recycling and diversion of organic waste through City programs and initiatives.
- B. Encourage provincial and federal governments to legislate measures to reduce waste through mechanisms such as extending responsibility of waste to the manufacturing companies, product stewardship and targeting the reduction of wasteful packaging.

Supplementary and Further Actions for Deeper GHG Reductions

A number of innovative policy and action options that were discussed during the formation of the Reduction Strategy were not able to be quantitatively modeled. The following actions were identified as opportunities for furthering reductions beyond those that will be achieved by the modeled policies and actions.

- Explore and consider best policies and practices of other jurisdictions (e.g. waste pick up every two weeks, pay-as-you-throw, EcoDepot recycling centre).
- Develop and initiate incentives and/or bylaws to reduce the volume of construction waste going to landfill.
- Consider opportunities for strategic outreach, education and enforcement of material bans at source to reinforce waste management priorities in all sectors – commercial, residential, industrial.



- Develop and initiate incentives and/or bylaws to encourage allocation of space for recycling/composting in multi-family developments (townhouse and apartment).

Due to the close relationship between solid waste management at the local and regional level, setting sector-specific targets for solid waste diversion can be simpler than for the transportation sector, for example. During the discussion of solid waste actions, the following two preliminary targets emerged:

- Meet or exceed Metro Vancouver’s waste diversion target of 70% by 2015;
- Divert all organic waste from the landfill by 2015.

Upstream GHG Emissions from Materials and Food

As consumers, the residents and businesses of Coquitlam are responsible for energy use and GHG emissions from the manufacture of materials, products and food, in addition to emissions from their disposal. The “upstream” manufacturing emissions typically dwarf the “downstream” waste disposal emissions. Using waste composition numbers from Metro Vancouver and upstream emission factors from the U.S. EPA’s Waste Reduction Model (WARM), upstream emissions associated with the solid waste from the City in 2007 amounted to 213,389 tonnes CO₂e. If included in Coquitlam’s emission inventory, upstream emissions from the food and materials disposed would comprise 27% of the total. This is comparable with estimates by the US EPA and the Institute for Self Reliance, which calculate that upstream emissions account for 33% and 37%, respectively, of total emissions in the United States. Acknowledging the shared responsibility for emissions among producers and consumers is a precursor for putting in place policies to reduce these emissions.

Key Solid Waste Indicators

The following indicators support tracking progress towards the GHG reductions set out in the Strategy.

Indicator	Description	2007 (Base Year)	Preferred Path
Solid Waste Diversion %	The percentage of all solid waste diverted from the landfill through re-use, recycling, reclamation and composting. <i>Data Source: Diversion data currently only available at the regional level. A Coquitlam specific breakdown may be available through future CEEI Reports.</i>	50%	2021 80% ²⁷ 2031 85% 2051 90%
Supplementary Indicators to Monitor²⁸		2007	Preferred
Single Family Solid Waste Diversion %	The percentage of solid waste diverted from land fill for single family dwellings in Coquitlam. <i>Data Source: Engineering & Public Works</i>	44%	↗
Solid Waste Disposed from Single Family Dwellings, per household	All solid waste disposed by single family dwellings (not recycled or composted), divided by total number of households. <i>Data Source: Engineering & Public Works</i>	.73 tonnes	↘

²⁷ The 2021 target was updated to align with Metro Vancouver’s aspirational solid waste diversion target for 2020 as set out in the Solid Waste Management Plan 2010. Original strategy modeling assumed a preferred path target of 75%.

²⁸ While strategy modeling did not derive long term targets at this level of detail, these local indicators assist in tracking progress.

3.7 Community-Wide & Corporate Action Synergies

The following measures cut across traditional energy and emission sectors and municipal departments, extending into the community. They are designed to foster alignment within the municipality to consolidate support for the Strategy and move initiatives forward within the City, with stakeholders in the community and with the broader public. The actions described in this section identify opportunities for Coquitlam's ongoing business activities to demonstrate leadership, and highlight practical approaches to reduce community GHG emissions.

Goals

The goals for community-wide and corporate synergy action include:

- Proactively navigate carbon and energy policy changes in BC and Canada, strategically using new developments to generate economic growth in Coquitlam.
- Strengthen the City's capacity to implement the actions in this Strategy, through monitoring and capacity building for the numerous initiatives already underway.

Planning Context

The recommended actions in this section identify opportunities to align corporate and community GHG reduction actions in a manner that realizes co-benefits and demonstrates the leadership role a City can play as a carbon producing member of the community. Synergies between corporate and community actions can result in several positive outcomes:

- Realization of corporate cost savings, while supporting a reduction in community-wide GHG emissions (i.e. right sizing the vehicle fleet)
- Demonstrate leadership and corporate/civic responsibility in addressing climate change
- Support community GHG reduction objectives set out in the Official Community Plan
- Support transformation of the market through demonstration of success as an early adopter of GHG reduction practices.

Community-Wide and Corporate Actions

- A. **Decision Making Climate Lens** – Explore opportunities to integrate mechanisms into Council and staff decision making to understand and evaluate the life cycle costs and carbon implications of large capital expenditures to better inform decision making.
- B. **Evaluate Near Term Costs** – As an initial step in developing an implementation plan, seek to understand the near term costs associated with available options to implement high level actions. In many cases, the City will have already committed funds for these actions through existing programs/initiatives. As such, the incremental cost to achieve GHG reduction targets will likely be significantly less than the total costs associated with a set of actions in a sector. The assessment of near term costs is also a valuable first step for establishing implementation priorities.

- C. **Community Carbon Offset Framework** – Explore the potential benefits of developing a framework for offsetting Coquitlam’s corporate carbon emissions with high quality community projects that are based on the first principles of carbon offset best practice²⁹ and general approach for such projects. Potential actions could include:
- Liaise with the BC Climate Action Secretariat and other leading local governments to vet opportunities, share information and build capacity in Coquitlam.
 - Identify projects and develop methodologies.
 - Explore development of a community carbon offset trust to retain money that would have been spent on offsets outside the community for local projects.
 - Put in place administrative systems to support project monitoring and reporting.
 - (Re)negotiation of City contracts to clarify and safeguard ownership of emission reductions when implementation involves other organizations and/or service providers. This will be important to demonstrate ownership of emission reductions.
- D. **Community Energy and Emission Manager** – Explore the feasibility of developing a staff position to support Strategy implementation. This position could potentially be supported financially by utility companies as is the case with a small but growing number of BC communities. The Community Energy Manager would play a central role in liaising with City departments and community stakeholders to implement the actions identified in each sector. Specific responsibilities could include:
- Leading district energy analysis and coordination.
 - Researching, evaluating and coordinating interdepartmental implementation of actions in the strategy.
 - Coordinating with Metro Vancouver and neighbour municipalities on implementation of community carbon reduction opportunities.
 - Coordinating energy and emission outreach and education with community stakeholder groups, residents and businesses.
 - Monitoring indicators, reporting progress and identifying appropriate shifts in focus.

²⁹ Carbon Offset First Principles: 1) Additional – the project must not be possible without the money/benefit provided by the offset; 2) Measureable – the emission reductions must be quantifiable and measurable; 3) Permanent – offset must represent a permanent reduction in emissions and not be reversible; 4) Unique – a single credit must be attributed to a single reduction, with mechanisms to prevent double counting; 5) Sustainable – offsets should ideally facilitate sustainable economic, environmental or social development initiatives.

Community Carbon Offsets

The City of Coquitlam is a signatory community to the BC Climate Action Charter, which includes a voluntary commitment to become carbon neutral in government operations by 2012, or demonstrate “making progress toward carbon neutrality” (as per Green Communities Committee Communiqué July 15, 2011). In July 2011, the BC Green Communities Committee released version 2 of the *Becoming Carbon Neutral Guidebook* (www.toolkit.bc.ca). This document describes several pathways for local governments to achieve carbon neutrality, including a new option for local governments to support the development of greenhouse gas reduction projects in the broader community. The reductions that occur through these projects would then be subtracted from the government operations total. The mechanism through which this works is applying the same principles that are used for carbon credit projects certified through the Kyoto Protocol’s Clean Development Mechanism and the Voluntary Carbon Market, with a lesser emphasis on quantification and verification of emission reductions, reporting and monitoring.

Community Carbon Offsets are an alternative to purchasing carbon credits through the Pacific Carbon Trust or another vendor to achieve carbon neutrality. This should be an attractive opportunity for Coquitlam and many other communities because it would allow them to:

- Leverage spending for community emission reductions projects with significant community co-benefits
- Help achieve carbon neutrality in municipal operations while keeping expenditures local
- Contribute to advancing emission reduction efforts provincially and specifically for BC municipalities

Project Requirements

For a community project to be eligible, reductions must be:

- *Additional* to those that would be possible without the financial / technical / coordination contributions of the local government
- *Real and Permanent* - The emission reductions need to meet minimum standards that prevent against leakage (activities shifting to a different locale or to occur in the future) and safeguards should be put in place to ensure that carbon emissions that are avoided or sequestered are not released during and after completion of the project
- *Measureable and documented* according to approved methodologies or methodology guidelines
- *Clearly owned* by the City of Coquitlam through documentation and written agreements when multiple parties are involved

Project Types

There are a number of different projects that have been identified in this Strategy that have the potential to become community carbon offset projects, including:

- District energy
- Residential and commercial building retrofits
- Organic waste composting
- Low carbon police vehicles
- Avoided deforestation and reforestation

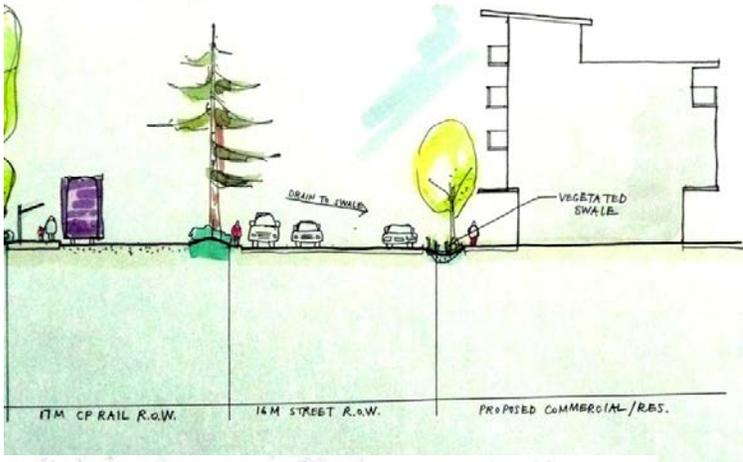
The BC Climate Action Secretariat is developing methodologies for some of these project types. Guidelines for the development of new GHG reduction quantification methodologies are also anticipated to be a part of the program launch.

Costs and Benefits

For the majority of projects that Coquitlam could consider for inclusion as a community carbon offset project the costs associated with implementation will be much greater than the cost of purchasing carbon credits from the Pacific Carbon Trust, which will be sold to local governments at \$25 per tonne of CO₂ equivalent. When there are significant community co-benefits associated with a project, the comparatively greater costs associated with implementation—versus purchasing carbon credits—could very likely be justified.

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4. Neighbourhood Vitality and GHG Reduction Approaches



4.1 Strategic Opportunities by Neighbourhood Type

Greenhouse gas emission reduction strategies are not uniform across a City. Unique areas which typify a part of, or an entire City “neighbourhood” create unique opportunities for reducing emissions, i.e. medium density/mixed use centres like Maillardville Core within the broader residentially-oriented Maillardville Neighbourhood. These design guidelines are a guide to right sizing and styling the sectoral strategies discussed above by neighbourhood type.

While the guidelines address emission reductions, they are also about supporting local jobs, fostering a sense of place, and designing a community that provides the transportation and housing choices necessary for residents to lead healthy lifestyles, protect their natural environment, and enjoy economically and socially vibrant neighbourhoods. The guidelines can help shape neighbourhoods and a community where businesses want to locate, and residents are interested in living, working, studying and playing over the course of their lives. The guidelines are fundamentally about vitalizing our neighbourhoods. The neighbourhood-specific guidelines would be complimented by more cross cutting strategies.

Below are strategic opportunities by type followed by more detailed guidelines:

Urban Centre: Strategic Opportunities (City Centre and ALRT Station areas)

- strengthening pedestrian, bike, and transit infrastructure;
- establishing low carbon district energy nodes;
- high/mid rise building operator training; and,

Medium Density, Mixed Use: Strategic Opportunities (Neighbourhood Centres)

- sufficient key destinations (e.g. park, library, key retail, food store and service) to support walkability;
- sufficient residential to support retail success and strong transit;
- strengthening pedestrian, bike, and transit infrastructure;
- strategically implementing district energy systems;
- strategic building/site scale renewables;
- mid/low rise building operator training; and,
- mid/low rise multi-family and commercial buildings targeted for recycling and food waste diversion.

Residential: Strategic Opportunities

- promoting purchase of high efficiency vehicles;
- promoting building/site scale renewable;
- encouraging secondary suites, carriage houses, live-work homes and other neighbourhood appropriate ground-oriented housing options;
- residential retrofits with an emphasis on furnaces; and,
- city facilitation of training and social marketing for backyard/neighbourhood composting.

Urban Centre

This is the medium to high density mixed use major centres (e.g. City Centre, Lougheed and Burquitlam Core). Relative to other neighbourhoods, transportation and building emissions are lower on a per resident basis and employee basis, and moderate in waste given lower recycling penetration in multi-unit buildings. Where appropriate, consider targeting the following opportunities for the City Centre and other high density centres:

Sector	Specific Strategies
Land Use	<p>Residential: Locate sufficient residential in high/mid/low rise or nearby in high/mid/low rise or townhouse to strengthen retail success, and load balancing for district energy; work-live homes.</p> <p>Commercial: Continue to concentrate most office and major retail employment in these areas to increase transportation efficiency/transit viability, and commercial networking.</p> <p>Public realm: street and park furniture; plazas; playgrounds/pocket parks; street retail café/restaurant terraces.</p>
Transportation	<p>Pedestrian: street and park furniture; covered/shaded sidewalks in many areas; more frequent and marked street crossing opportunities; intersection buttons; wide curbed sidewalks with ramps and bulges; high density and connectivity of networks.</p> <p>Bike: Bike parking and end of trip infrastructure in commercial and residential buildings and key destinations; on-street bike parking; facilities and right-of-ways are dedicated, wide and ideally separated by some hard or soft barrier; high density and connectivity of networks; intersection buttons; easy connections to other travel modes.</p> <p>Transit: high frequency; long hours; med-high speeds; high density transit stops; strategic shelters; strong inter-modality; site major multi-modal transportation hub in these areas (with commercial elements and appealing public realm).</p> <p>Automobiles: Maximize alternatives; manage off and on-street parking; encourage/incent car sharing in residential and commercial; promote electric bikes; increase plug in availability.</p>
Buildings	<p>Typologies: high rise, mid-rise, low rise, significant mixed use buildings.</p> <p>Performance: high/mid rise building operator training; high/mid-rise retrofit program with district energy connection; advanced ASHRAE performance.</p>
Energy Supply	<p>District Energy: strategically locate district energy systems in locations where there is the appropriate energy demand and the opportunity to generate heat using low carbon energy sources, such as geothermal, geo-exchange, waste heat recovery, etc.</p> <p>Renewables: large roofs near heat demand for solar thermal.</p>
Waste	<p>Reduction: program to reduce retail packaging.</p> <p>Recycling: require space in new buildings; mandatory recycling.</p> <p>Composting: food-related commercial/institutional for priority composting; require space in new buildings; phase in curbside.</p>
Greenspace	<p>Trees: plazas; playgrounds, schools; select tree-lined streets.</p> <p>Parks: pocket parks; greenways; green roofs; school greenspace.</p> <p>Food: explore development of accessible community gardens and promotion of regional food.</p>

Medium Density, Mixed-Use

These neighbourhoods are characterized as areas with retail, service and medium to high density residential buildings in close proximity. They are located in key nodes throughout the City and are medium to small neighbourhood cores (e.g. Austin Heights, Maillardville). Transportation and building emissions are currently low to moderate on a per resident basis and per employee basis relative to other neighbourhood types, and moderate in waste given lower recycling penetration in apartments and townhouses. Where appropriate, consider targeting the following opportunities for medium density mixed-use nodes:

Sector	Specific Strategies
Land Use	<p>Residential: sufficient residential population to support retail success; work-live homes.</p> <p>Commercial: focus sufficient <i>key</i> retail and service destinations (grocery, pharmacy, restaurant, café, doctor, library, gym...) to support walkability and strong transit; some small offices.</p> <p>Public realm: street and park furniture; plazas; playgrounds/pocket parks; medium sized parks; street retail café/restaurant terraces; school gardens; boulevards.</p>
Transportation	<p>Pedestrian: street and park furniture; covered/shaded sidewalks in areas with high foot traffic; pedestrian street crossings; intersection buttons; medium/wide width curbed sidewalks with ramps; strong connectivity of different transportation modes.</p> <p>Bike: end of trip infrastructure in commercial and residential buildings and key destinations; bike facilities shared on traffic calmed streets and multi-use pathways; on-street bike parking; moderate network density/high connectivity; key intersection buttons; strong bike-bus connectivity and compatibility, notably to multi-modal transportation hub.</p> <p>Transit: moderate frequency; moderate hours; med speeds; high to medium density transit stops; strategic shelters; strong bus-bike compatibility; strong pedestrian/bike network connectivity and compatibility.</p> <p>Automobiles: maximize alternatives; manage off and on-street parking; encourage/incent car sharing in residential and commercial; promote ultra low emission automobiles and E-bikes; increase plug in availability.</p>
Buildings	<p>Typologies: some high-rise, mid-rise; low rise; townhouse; ground oriented with multiple units, secondary suites or small format houses (e.g. carriage houses); significant mixed use buildings.</p> <p>Performance: mid rise building operator training; mid-rise retrofit program with district energy connection; advanced ASHRAE and EnerGuide standards.</p>
Energy Supply	<p>District Energy: Extend nodes where sufficient density, mixed use.</p> <p>Renewables: Solar thermal and geexchange near demand, potentially DE integrated.</p>
Waste	<p>Reduction: program to reduce retail packaging; smart product and packaging <i>education</i>.</p> <p>Recycling: require space in new multi unit buildings; mandatory recycling.</p> <p>Composting: require space in new buildings; curbside collection.</p>
Greenspace	<p>Trees: tree-lined streets and boulevards; parks; playgrounds; schools.</p> <p>Parks: encourage greenroofs; school greenspace.</p> <p>Food: explore potential of backyard food gardens; school food gardens; proximity community garden access; promotion of local/regional food in retail.</p>

Residential

This is the City's lower density, residentially-oriented areas. Transportation and building emissions are relatively high on a per resident basis. Waste emissions are potentially lower. Where appropriate, consider targeting the following opportunities for lower density residential areas:

Sector	Design Guidelines
Land Use	<p>Residential: supplement single family with carriage housing, secondary suites, some townhouse and multi-unit ground oriented.</p> <p>Commercial: encourage live-work; support development of centered key destinations (e.g. small grocery, smaller café/restaurant,) within walking distance (potentially adjacent medium density/mixed use "neighbourhood").</p> <p>Public realm: park furniture; nature; pocket parks/playgrounds.</p>
Transportation	<p>Pedestrian: park furniture; appropriate street crossing opportunities that are safe and accessible; key intersection buttons; medium width sidewalks; ramps if curbed; good connectivity; good intermodality, notably to access multi modal hub.</p> <p>Bike: bike facilities and right-of-ways are signed/painted on shared street, moderate density/moderate connectivity to boulevards and trails to greenspace; parking and end of trip infrastructure at key destinations; strong bike-bus connectivity and compatibility.</p> <p>Transit: moderate frequency; moderate hours; med speeds; medium density transit stops; strong pedestrian/bike connectivity and compatibility.</p> <p>Automobile: promote ultra low emission automobiles and E-bikes; encourage car sharing access.</p>
Buildings	<p>Typologies: ground-oriented housing choices, townhouse, low rise, focussed/small format mixed use buildings within walksheds.</p> <p>Performance: residential retrofits with an emphasis on <i>furnaces</i>, hot water systems, windows, insulation; advanced EnerGuide performance.</p>
Energy Supply	<p>District Energy: no.</p> <p>Renewables: solar thermal and geoexchange.</p>
Waste	<p>Reduction: smart product and packaging <i>education</i>.</p> <p>Recycling: mandatory recycling.</p> <p>Composting: explore backyard or neighbourhood composting or curbside.</p>
Greenspace	<p>Trees: tree-lined streets and boulevards; parks; playgrounds; school greenspaces; residential tree program.</p> <p>Parks: nature parks, Large parks, school greenspaces.</p> <p>Food: explore potential for backyard food gardens, school food gardens, locating community gardens for residents in mixed use and urban zones; urban farms.</p>

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5. Advancing Implementation

5.1 Advancing Implementation

This Community Greenhouse Gas Reduction Strategy sets the foundation for future efforts to reduce energy use and greenhouse gas emissions across Coquitlam and describes the types of actions that will be necessary in order to make the switch from emissions growth to reductions. This Strategy was developed in close partnership with an Interdepartmental Staff Working Group with particular expertise in the policy tools and levers available to the City to influence energy use and emissions in the areas of land use, buildings, transportation and solid waste.

The quantitative energy and emissions modeling of the “preferred path” – the collection of actions within each sector – lend weight to the land use directions spelled out in Coquitlam’s Citywide Official Community Plan by showing that the emphasis on multi-family and mixed-use development around transit nodes and neighbourhood centres will significantly reduce buildings and transportation emissions.

To strengthen implementation there are several major categories of next steps to pursue. The following are recommended:

- Seek opportunities in current and future interdepartmental work programs to move forward with the preliminary “exploratory” actions in each sector, which are necessary for information gathering and building support among stakeholders.
- Investigate opportunities to hire a Community Energy Manager to facilitate coordinated implementation of the Community GHG Reduction Strategy and to monitor progress.
- Develop an Implementation Plan. This stage would include more detailed consideration of implementation opportunities through existing work plans, cost-benefit analysis of options, identifying potential funding sources (external and internal) for specific actions and consideration of complementary co-benefits.
- Investigate opportunities to form new partnerships and strengthen existing relationships with community organizations and neighbouring communities to design and implement capacity building and education programs.
- Identify a complete set of citizen and business actions that complement the actions in this Strategy, and that can be used in marketing and outreach activities.
- Consider opportunities to develop Community-Wide and Corporate Synergy Actions to catalyze and increase internal capacity to implement the other actions in the Strategy.



6. Tracking Action and Monitoring Progress

6.0 Tracking Action & Monitoring Progress

The purpose of the section is to outline the near term, high-level implementation steps associated with the actions in the Strategy.

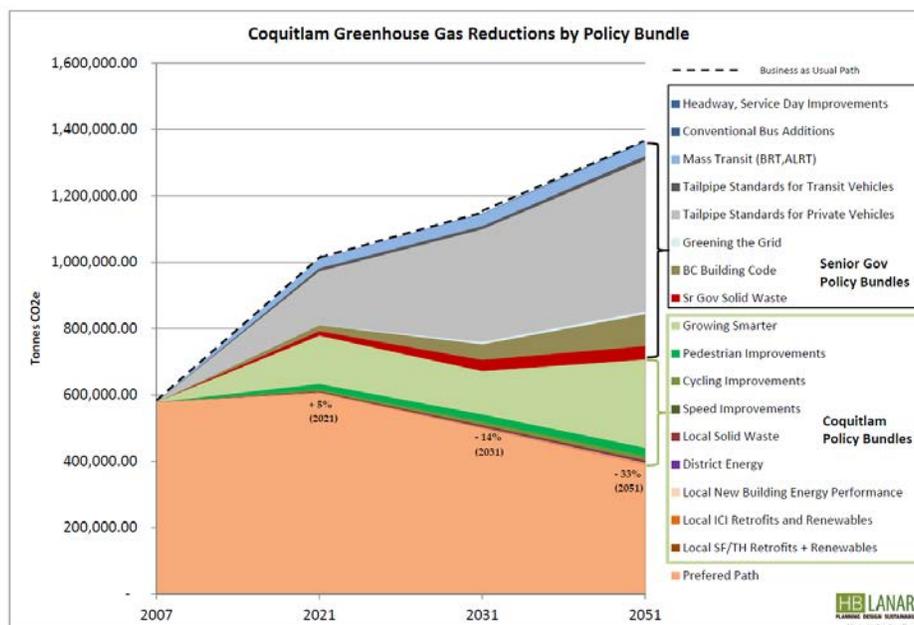
The following **Actions Tracking and Outlook** framework addresses the status of all high level actions set out in the Strategy, identifying existing plans or initiatives supporting each action, identifying initiatives *Currently Underway*, *First Priority Initiatives* the City should consider in the near future, and *Second Priority Initiatives* to be examined as implementation moves forward.

Many of the actions require time of existing city staff members. In addition, several actions are closely aligned with existing work plans and may already be partially or fully funded. As part of future Implementation Plan development, it will be valuable to understand the incremental capital costs and/or human resources required to implement actions beyond what has already been committed or will be paid for through other initiatives, government agencies, organizations. This incremental cost should be the focus when estimating the true cost of implementing future actions.

The information presented in the following “Actions Tracking and Outlook” matrix is a starting point for preliminary planning purposes and should be updated on an ongoing basis as actions are further defined and project timing is confirmed. This is a living document, anticipated to evolve as the City monitors and adjusts to new information on progress and through evaluation of new opportunities.

Greenhouse Gas Reduction Policy Bundles to Guide Priority Actions

As noted in Section 3 of the Strategy, it is critical to recognize the interconnection and co-dependency of local and senior government actions, as well as the inter-relationship between individual sectors. The link between density, pedestrian/bicycle infrastructure and transit service is an example of this relationship. While noting the cross-dependencies, it is important to recognize that “Growing Smarter” (land use/density) and supporting transportation actions are expected to have the greatest impact for the Coquitlam, as illustrated in the table below, and should shape priorities for action.



6.1 ACTIONS TRACKING AND OUTLOOK – Working Document (as of Q4 2011)

Land Use

ACTIONS	Incremental Effort ¹	GHG Reduction Potential	Plans Already Supporting Action	Actions Currently Underway	First Priority Initiatives	Second Priority Initiatives	Lead
A. Work with the community to transition lower density neighbourhood commercial centres to higher density, mixed-use, walkable neighbourhood centres. Give consideration to strategically extending existing commercial centres or establishing new ones, scaled to the neighbourhood context.	low	high	<ul style="list-style-type: none"> » City Centre AP » Burquitlam NP » Lougheed NP » Austin Heights NP » Maillardville NP 	<ul style="list-style-type: none"> » Maillardville NP Update » Partington Creek Neighbourhood Plan 	<ul style="list-style-type: none"> » Review Burquitlam NP » Explore opportunities in OCP identified neighbourhood centres » Review density and bonusing provisions of C-7, and RM 4-5-6 Zones 		Planning
B. Facilitate new housing choices in Southwest Coquitlam. Continue to encourage secondary suites, infill cottages, tri-plexes & quadruplexes.	low	low/med	<ul style="list-style-type: none"> » Neighbourhood Attached Residential provisions in Maillardville, Lougheed, Burquitlam and Austin Heights » Zoning Bylaw 	<ul style="list-style-type: none"> » Preparing Housing Choices Guide for developers » Exploring expansion of housing choice areas in Maillardville 	<ul style="list-style-type: none"> » Review opportunities in Burquitlam 	<ul style="list-style-type: none"> » In the future, explore secondary suites in townhouses and lock-off suites in apartments 	Planning
C. Support transition of the City Centre to a greater mix of uses, at higher densities and with more employment opportunities	medium	high	<ul style="list-style-type: none"> » City Centre Area Plan » Recently revised C-4 Zone 		<ul style="list-style-type: none"> » City Centre Plan Update/ Transit Corridor Review » Review land uses along the Barnet Corridor 		Planning
D. Station area planning for Evergreen Line focused on transit oriented land uses	low	high	<ul style="list-style-type: none"> » Burquitlam NP » Lougheed NP » City Centre Area Plan 		<ul style="list-style-type: none"> » City Centre Area Plan Update/ Transit Corridor Review » Burquitlam NP Review » Review density and bonusing provisions of C-7, and RM 4/5/6 Zones 		Planning
E. Focus majority of growth within 800 metres of high frequency transit service	low	high	<ul style="list-style-type: none"> » Revised density provisions of RM2 & RM3 Zones » City Centre Area Plan » Burquitlam & Lougheed NP 		<ul style="list-style-type: none"> » City Centre Plan Update/ Transit Corridor Review 		Planning Engineering TransLink
F. Integrate more live/work uses throughout the City	low	high	<ul style="list-style-type: none"> » Austin Heights NP Policy » C-5 Permits Employment Living » Home Based Business Regul. » Schoolhouse Work-Live Policy 				Planning Econ. Dev
G. Explore opportunities to provide greater opportunities for smaller format businesses in neighbourhood centres.	low	low	<ul style="list-style-type: none"> » Neighbourhood Centre design guidelines require narrow retail frontages » C-4 & C-5 Zoning permits employment living uses. 		<ul style="list-style-type: none"> » Review opportunities in Burquitlam NP Area 	<ul style="list-style-type: none"> » In the future develop incentives to increase small office space in City Centre 	Planning Econ. Dev
H. Create opportunities for a diversity of service and entertainment destinations in neighbourhood centres.	medium	low	<ul style="list-style-type: none"> » Permitted mixed-use zones in designated centres » C-1 Zone added new uses 				Planning Econ Dev.

¹ Refers to estimated incremental effort over typical departmental work programs for identified initiatives

Buildings							
ACTIONS	Incremental Effort	GHG Reduction Potential	Plans/Initiatives Already Supporting Action	Actions Currently Underway	First Priority Initiatives	Second Priority Initiatives	Lead
A. Continue to support a high increase in multi-unit and mixed use development.	low	medium	<ul style="list-style-type: none"> » CWOCP » City Centre AP » Lougheed NP » Burquitlam NP » Austin Heights NP » Maillardville NP » Fraser Mills 	<ul style="list-style-type: none"> » Partington Creek NP » Implementation of existing neighbourhood and area plans 	<ul style="list-style-type: none"> » Burquitlam NP Review » City Centre Area Plan Review/ Transit Corridor Review » Future Neighbourhood Plans 	<ul style="list-style-type: none"> » Future Neighbourhood Planning 	Planning
B. Strategic outreach and education opportunities to encourage building owners and users to reduce energy use and solid waste, and invest in renewable on-site energy.	low	low	<ul style="list-style-type: none"> » CWOCP » Continuing staff education and capacity building 	<ul style="list-style-type: none"> » Staff education and capacity building for current and emerging BC Building Code 	<ul style="list-style-type: none"> » Investigate opportunities to support progress monitoring through collection of green building information for new buildings or retrofits during Building Permit application process » Explore & evaluate partnership programs to support local businesses in reducing carbon footprint » Investigate hiring a Community Energy Manager to develop pilot programs or facilitate outreach 		Planning E & PW
C. Strategic outreach and education for developers, realtors and other stakeholders to promote energy efficiency, passive design and renewable energy technologies and practices.	low	low	<ul style="list-style-type: none"> » CWOCP » Continuing staff education and capacity building 	<ul style="list-style-type: none"> » Staff education and capacity building for current and emerging BC Building Code 	<ul style="list-style-type: none"> » Explore opportunities to raise awareness of Sr. Government retrofit and renewable energy programs » Investigate hiring a Community Energy Manager to develop pilot programs or facilitate outreach » Review building related bylaws to identify opportunities to eliminate barriers to green building features 	<ul style="list-style-type: none"> » Consider developing a voluntary green building checklist » Consider reporting out green feature success stories involving developer/City cooperation » Consider opportunities to recognize green building/ energy leadership in the community (i.e. awards) » Investigate feasibility of hosting local workshops to educate the building and development industry 	Planning E & PW
D. Market sensitive land use tools to encourage higher performance buildings, passive design and renewable energy.	medium	low	<ul style="list-style-type: none"> » CWOCP 		<ul style="list-style-type: none"> » Explore opportunities to utilize new Development Permit Area Guideline provisions of the <i>Local Government Act</i> as part of Neighbourhood and Area Planning processes. 	<ul style="list-style-type: none"> » Explore incentive measures to encourage green buildings » Consider fee rebates that remove disincentives for integrating green features (i.e. higher construction costs equal higher fees) 	Planning

Transportation

ACTIONS	Incremental Effort	GHG Reduction Potential	Plans/Initiatives Already Supporting Action	Actions Currently Underway	First Priority Initiatives	Second Priority Initiatives	Lead
A. Support continued and steady implementation of new cycling and pedestrian facilities in coordination with the Strategic Transportation Plan (STP).	low	medium	<ul style="list-style-type: none"> » CWOCP » Strategic Transportation Plan (STP) » Zoning Bylaw (bike parking requirements) 	<ul style="list-style-type: none"> » STP Update » Neighbourhood Planning » Area Planning » Zoning Bylaw requirements for short & long term bicycle parking in new development 	<ul style="list-style-type: none"> » Review existing City documents to align with updated Strategic Transportation Plan 	<ul style="list-style-type: none"> » Implement City-wide greenways, sidewalks and bicycle routes 	Engineering/ Planning
B. Work with transit planning/operational authorities to implement priority measures that support transit throughout the City, in coordination with the STP.	medium	medium	<ul style="list-style-type: none"> » CWOCP » Strategic Transportation Plan 	<ul style="list-style-type: none"> » Evergreen Line transit integration planning 	<ul style="list-style-type: none"> » Work with TransLink on NE Sector Area Transit Plan 2014 	<ul style="list-style-type: none"> » Implement transit passenger support measures (i.e. shelters) 	Engineering
C. Increase walking and cycling connectivity and infrastructure at the neighbourhood scale.	low	medium	<ul style="list-style-type: none"> » CWOCP » Implementation through Neighbourhood 	<ul style="list-style-type: none"> » Implementation through capital projects and redevelopment 	<ul style="list-style-type: none"> » Increase the level of capital investment for pedestrian/cycling facilities in accordance with the STP » Construct new bicycle network facilities on Poirier Street and David Avenue » Increase pedestrian/cycling infrastructure in pedestrian precinct areas 	<ul style="list-style-type: none"> » Implement City-wide greenways, sidewalks and bicycle routes » In the future, develop more N-S multi-modal links across CPR ROW in City Centre 	Engineering Planning
D. Promote and, where possible, invest in transportation demand management (TDM) measures in new developments, neighbourhood centres and the City Centre.	low/ medium	low	<ul style="list-style-type: none"> » CWOCP » Strategic Transportation Plan 	<ul style="list-style-type: none"> » Explore opportunities to partner with TransLink » Zoning Bylaw amendment to require bike parking 	<ul style="list-style-type: none"> » Parking management in rapid transit station areas » Facilitate implementation of car-share company providers 	<ul style="list-style-type: none"> » Explore opportunities for the City to demonstrate leadership by promoting sustainable commute policies for employees above and beyond current practice. 	Engineering
E. Policies to support low emission vehicles.	medium	low	<ul style="list-style-type: none"> » CWOCP » Strategic Transportation Plan 			<ul style="list-style-type: none"> » In the future, explore opportunities for implementing charging stations in residential buildings and City-owned parking lots 	Engineering Planning
F. Work with key partners to promote education and outreach programs to support active transportation.	low	low	<ul style="list-style-type: none"> » CWOCP » Strategic Transportation Plan 	<ul style="list-style-type: none"> » Walkability program 	<ul style="list-style-type: none"> » Promote TransLink's Travel Smart Program to broader community 		Engineering

Solid Waste

ACTIONS	Incremental Effort	GHG Reduction Potential	Plans/Initiatives Already Supporting Action	Actions Currently Underway	First Priority Initiatives	Second Priority Initiatives	Lead	
A. Support Metro Vancouver efforts to increase recycling and diversion of organic waste through City programs and initiatives.	low	low	<ul style="list-style-type: none"> » CWOCP » Adopted Metro Vancouver's Solid Waste Management Plan 	<ul style="list-style-type: none"> » Initiated SF mattress recycling » Voluntary organic waste collection for single family dwellings (Green Can Program) » Blue bin recycling program » Composting education programs and subsidized compost bins » Support waste recycling for community events 	<ul style="list-style-type: none"> » Mandatory organic waste collection for SF 	<ul style="list-style-type: none"> » Consider mandatory recycling (including organics) at all community events 	Engineering Parks, Recreation & Culture	
» Develop and initiate incentives and/or bylaws to reduce the volume of construction waste going to landfill.	med-high					<ul style="list-style-type: none"> » Develop Recycling Bylaw for demolition and construction 	<ul style="list-style-type: none"> » Consider developing recycling programs for demolition and construction 	Planning Engineering
» Consider opportunities for strategic outreach, education and enforcement of material bans at source to reinforce waste management priorities in all sectors – commercial, residential, industrial	low		<ul style="list-style-type: none"> Hosted Events (Annual) <ul style="list-style-type: none"> » Christmas tree chipping » Citywide Garage Sale » Attended Events (~10-12/yr) <ul style="list-style-type: none"> » Canada Day » Farmer's markets » Salmon Come Home 	<ul style="list-style-type: none"> » Green Can Outreach Campaign » Waste recycling workshops (i.e. 70 waste reduction and recycling workshops were facilitated with elementary schools in 2011) 	<ul style="list-style-type: none"> » Recycling workshops/programs to middle and secondary schools » Multifamily education program to increase recycling » Improve recycling at civic facilities 	<ul style="list-style-type: none"> » Consider mandatory recycling for multifamily » Consider mandatory multifamily organics recycling 	Engineering	
» Develop and initiate incentives and/or bylaws to encourage allocation of space for recycling/composting in multi-family developments (townhouse and apartment).	low					<ul style="list-style-type: none"> » Pilot program for organics collection in multi-family » Explore opportunities/feasibility to require the allocation of space for recycling facilities in new multi-family development 	<ul style="list-style-type: none"> » Multifamily organics recycling open to all 	Planning & Engineering
B. Continue to pursue City Policy & Service Initiatives	low		low		<ul style="list-style-type: none"> » Review current collection services contract and investigate alternatives, including automated collection 	<ul style="list-style-type: none"> » Update solid waste management bylaw 	<ul style="list-style-type: none"> » Explore opportunity to establish an EcoDepot facility 	Engineering
C. Encourage Provincial and Federal governments to legislate measures to reduce waste through mechanisms such as extending responsibility of waste to the manufacturing companies, product stewardship and targeting the reduction of wasteful packaging.	low	low	<ul style="list-style-type: none"> » Adopted Metro Vancouver Solid Waste Management Plan 	<ul style="list-style-type: none"> » Support awareness of small appliance recycling services provided by Province 	<ul style="list-style-type: none"> » Continue to explore opportunities to support Metro Vancouver landfill banned items 		TBD	

Energy Supply

ACTIONS	Incremental Effort	GHG Reduction Potential	Plans Already Supporting Action	Actions Currently Underway	First Priority Initiatives	Second Priority Initiatives	Lead	
A. Continue to encourage implementation of district energy in Northeast Coquitlam and Waterfront Village Centre (Fraser Mills)	TBD	low ²	<ul style="list-style-type: none"> » CWOCP » Northeast Coquitlam Area Plan » Waterfront Village Neighbourhood Plan 	<ul style="list-style-type: none"> » Feasibility Studies in Northeast Coquitlam 	<ul style="list-style-type: none"> » Develop a Strategy for implementation of District Energy in key growth areas of the City 		Engineering & Private Dev.	
B. Explore potential opportunities for district energy systems in fast growing Coquitlam neighbourhood Centres (both new and existing) and City Centre.	TBD	low ²	<ul style="list-style-type: none"> » CWOCP » City Centre Area Plan 	<ul style="list-style-type: none"> » City Centre Civic Precinct Feasibility Study 	<ul style="list-style-type: none"> » Develop a Strategy for implementation of District Energy in key growth areas of the City » Determine governance model for future district energy systems 	<ul style="list-style-type: none"> » Undertake feasibility analysis of district energy for identified growth areas » Explore expansion of City Centre Civic Precinct District energy to non-municipal buildings 	Engineering	
» Creation of service area bylaws to support district energy							<ul style="list-style-type: none"> » Develop policy framework to support district energy, such as requirements for necessary servicing 	Engineering Planning
» Develop educational and promotional resources to encourage integration of renewable energy technologies in new single family dwellings.							<ul style="list-style-type: none"> » Identify existing Sr. Government resources available for local promotion » Identify cost effective methods to disseminate available information 	Engineering Planning

Community & Corporate Synergies

ACTIONS	Plans/ Initiatives Already Supporting Action	Actions Currently Underway	First Priority Initiatives	Second Priority Initiatives	Lead
A. Investigate opportunities to hire a Community Energy Manager to support Strategy implementation			<ul style="list-style-type: none"> » Explore potential funding sources to create a Community Energy Manager staff position to facilitate and coordinate implementation of key actions in this strategy. 		TBD
B. Explore and evaluate potential benefits of developing a Community Carbon Offset Framework	<ul style="list-style-type: none"> » Council resolution directing staff to set up a Climate Action Reserve Fund (November 7, 2011) 	<ul style="list-style-type: none"> » Identify projects that qualify for carbon offsets 		<ul style="list-style-type: none"> » Explore and evaluate the potential benefits of developing Community Carbon Offset Framework 	E & PW
C. Explore opportunities to integrate a climate lens into staff and Council decision making	<ul style="list-style-type: none"> » Corporate Energy Plan 	<ul style="list-style-type: none"> » Corporate Energy Manager estimated the carbon impacts of the new City Centre library building prior to purchase (for information) 	<ul style="list-style-type: none"> » Integrate carbon impacts evaluation for new City buildings (i.e. Burke Mountain Fire Hall) 		E & PW Strategic Initiatives

² The GHG reduction potential for district energy is indicated as "low" in comparison to other policy areas due to the proportionally small building area assumed for district energy in the modeling, and longer term implementation assumptions.

6.2 Monitoring and Indicators Summary

Monitoring the change in key indicators over time is one of the most effective mechanisms to track the City's progress towards meeting its emission reduction targets. By tracking these indicators the City can also identify successes and shortfalls of specific actions, providing information that can be used to make adjustments. The indicators in this table were selected based on the following criteria: data can be gathered/monitored by the city and they have a significant impact on energy use and emissions. The City should alter this table as they see fit to best meet its needs. As new data becomes available, the table can be populated. Some data will only be available every 2-5 years if dependent on senior government sources.

Recent Trend 	The color of arrow indicates whether the trend is contributing to emission reductions (green), emission increase (red), or neutral impact (white). Direction of arrow corresponds to recent direction of indicator value.
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Land Use

Indicator	2007 (Base Year)	Preferred Path	Recent Trend	Possible Data Sources	Potential Reporting Interval
Dwellings within a 10 minute walk of commercial services	26%	2051 50%		Coquitlam GIS data	Annual
Dwellings within a 10 minute walk of rapid transit	<1%	2051 25%		Coquitlam GIS data	Annual
Ratio of local jobs to workers	0.5	2051 0.79		Metro Vancouver, Canada Census	4 Year Census Intervals
Residential Density	~20 people/ha	~37 people / ha by 2041		GIS and BC Stats	Annual

Transportation

Indicator	2007 (Base Year)	Preferred Path	Recent Trend	Possible Data Sources	Potential Reporting Interval
Mode Split for All Trip * Revised to align with Strategic Transportation Plan (STP) analysis, 2011. Original GHG modeling analyzed Journey to Work Census Data, 2006.	2008 Auto: 82% Transit: 9% Bike: 0.2% Walk: 8.0% Other: 1.1%	2031 Auto: 70% Transit: 15% Bike: 3% Walk: 12%		Census & TransLink Trip Survey	Typically 4 Year data availability, but varies based on TransLink Schedule. Census data is a 5 year cycle.
Average GHGs per household resulting from personal vehicle travel	6.2 tonnes CO ₂ e / household	2.6 Tonnes of CO ₂ e/ household in 2051		BC CEEI reports	Every 2 Years, pending Provincial release of CEEI Report
Sustainable Network Development * Revised to align with Strategic Transportation Plan (STP) analysis, 2011.	2007 Sidewalks/Paths 457 km Bicycle Routes 15 km Frequent Transit Routes 6.2 km	2031 Sidewalks/Paths 700 km Bicycle Routes 150 km Frequent Transit Routes 27 km		Engineering and Public Works	Annual
Average Annual Vehicle Kilometres Traveled (VKT) per household	Household VKT 2007 = ~21,800			BC CEEI reports	Every 2 Years, pending Provincial release of CEEI Report

Buildings

Indicator	2007 (Base Year)	Preferred Path	Recent Trend	Possible Data Sources	Potential Reporting Interval
% of new residential development as multi-family buildings	Existing proportion of dwellings as multi-family = 53% (CEEI 2007)	% of new dwellings as multi-family 2007-2021: 84% 2021-2031: 82% 2031-2051: 93%		City Data; CEEI inventory	Annual by City; every 2 years via CEEI inventory
Potential Future Indicators, Pending Available Data					
Average energy demand intensity (kWh/ m ² / year)	Single Family 201 Townhome 182 Low Rise 173 High Rise 173 Commercial 550	Single Family 116 Townhome 78 Low Rise 104 High Rise 77 Commercial 326 (in 2051)		BC CEEI Indicator under consideration; BC Assessment – Availability to be confirmed with next CEEI Report	Every 2 Years, pending release of Provincial CEEI Report
Annual Building Energy Retrofits Performed	2007 (Base Year)	Preferred Path	Recent Trend	Possible Data Sources	Potential Reporting Interval
Residential	unknown	345 annually		No accurate data source currently available	To be determined
Commercial	unknown	10 annually		No accurate data source currently available	To be determined
Building Scale Renewables: New Buildings	unknown	14% of new buildings by 2051		Building Permits Division, or CEEI Indicator under consideration	To be determined, pending Provincial CEEI inventory or implementation of Building Permits Division tracking mechanism
<i>See also, Land Use Indicators</i>					

Energy Supply

Indicator	2007 (Base Year)	Preferred Path	Recent Trend	Possible Data Sources	Potential Reporting Interval
Building Area Connected to District Energy	0 m ²	2031: 333,100 m ² 2051: 436,800 m ²		CEEI Indicator under consideration	Every 2 years, pending release of Provincial CEEI Report
District Energy GHG Emissions Factor	NA	2031: 83 g CO ₂ e/kWh 2051: 37 g CO ₂ e/kWh		To be determined (City or Utility Provider)	To be determined

Solid Waste

Indicator	2007 (Base Year)	Preferred Path	Recent Trend	Possible Data Sources	Potential Reporting Interval
Solid Waste Diversion Rate	50%	2021 80% (revised from 75%, as per ISWRMP) 2031 85% 2051 90%		Metro Vancouver; may be included in a future CEEI Report	Every 2 years, pending release of Provincial CEEI Report
Single family Solid Waste Diversion %	44%	↗ Preferred Trend - Strategy modeling did not define long term targets at the single family household level; however it is valuable to track the trend to measure progress.		Engineering and Public Works	Annually
Solid Waste Disposed from Single Family Dwellings, per household	.73 tonnes	↘ Preferred Trend - Strategy modeling did not define long term targets at the single family household level; however it is valuable to track the trend to measure progress.		Engineering and Public Works	Annually

Appendices



Appendix A – Bill 27, 2008 OCP Amendment

Schedule “A” to Bylaw 4110, 2010

3.1 Taking Local Action to Address Climate Change

ISSUES

A GLOBAL ISSUE REQUIRING A LOCAL RESPONSE

Climate change has global, regional and local implications for ecosystems, infrastructure and people. The 2007 report of the International Panel on Climate Change (IPCC) concludes that the earth’s climate is changing, the change is being caused by human activities, and its effects will worsen if no action is taken. Unchecked, climate change is expected to have significant impacts on food production, water supply, ecosystems and the frequency of extreme weather events.



The largest source of greenhouse gas (GHG) emissions is carbon dioxide released through combustion of fossil fuels used to move vehicles and heat and power buildings. A smaller proportion of emissions is methane produced from decomposing waste.

Recognizing the required collective effort and important role municipal governments can play in mitigating climate change, the Provincial Government amended Section 877 (Bill 27, 2008) of the *Local Government Act*, requiring all municipalities to include targets, policies and actions to reduce greenhouse gases in their Official Community Plans.

For several years, Coquitlam’s Official Community Plan has included and developed a land use and transportation policy framework that complements climate action. The following policies and actions build on existing CWOCP policy directions, outlining additional ways the City is prepared to strengthen its action on climate change.

THE NEED FOR BROADER COOPERATION

The long range policy framework of Coquitlam’s Official Community Plan provides a solid foundation to make significant progress towards complete, compact, walkable and transit oriented communities; however, **it is clear that the City’s community-wide greenhouse gas reduction targets will only be reached with further action by senior levels of government, particularly in the key sectors of buildings and transportation.**

OBJECTIVE

Coquitlam will work in cooperation with senior levels of government to reduce the City's annual community-wide greenhouse gas emissions 15% below 2007 levels by 2031 and per capita annual greenhouse gas emissions 30% below 2007 levels by 2021.

POLICIES AND ACTIONS

Community-wide

- a. Complete a Community Greenhouse Gas Reduction Strategy by the end of 2011 to support the City in integrating energy and GHG reduction opportunities in broader land use, transportation, solid waste and infrastructure planning.
- b. Complete the on-going update of the City's Strategic Transportation Plan, in accordance with the work program approved by Council in 2009.
- c. Continue to pursue opportunities to implement the City's Corporate Climate Action Plan, demonstrating the City's commitment to local climate action.
- d. Encourage Regional, Provincial and Federal levels of government to expand and improve measures to reduce greenhouse gases through actions such as leading edge research, incentive programs, expansion of transit service, progressive building codes and strengthened legislation.

Land Use

- e. In consultation with the community, explore the longer term transition of low density neighbourhood commercial centres to vibrant, walkable mixed-use nodes. To improve access to daily needs for Coquitlam residents, also give consideration to strategically extending existing commercial centres or establishing new ones, scaled to the neighbourhood context.
- f. Explore, in consultation with the community, broader opportunities for facilitating new housing choices in Southwest Coquitlam's lower density neighbourhoods.
- g. Continue to support, in consultation with the community, further transition of the City Centre to a highly urban and vibrant downtown with a compact mix of land uses and employment opportunities.
- h. Support integration of the planned Evergreen Rapid Transit Line through station area planning that considers transit oriented land uses and densities.
- i. Support future rapid transit service along the Lougheed corridor with transit supportive land uses around stations in the longer term.
- j. Focus the majority of growth within 800 metres of high frequency transit service.
- k. Explore opportunities to integrate more live/work uses throughout the City.



- l. Explore implementation tools to provide greater opportunities for smaller format commercial offices in neighbourhood centres to encourage and support small business.
- m. Create opportunities for a diversity of service and entertainment destinations in neighbourhood centres.

Transportation



- n. Support continued and steady implementation of new cycling and pedestrian facilities in coordination with the Strategic Transportation Plan, as amended.
- o. Work with transit planning/operational authorities to implement priority measures that support transit throughout the City, in coordination with the Strategic Transportation Plan and Neighbourhood Plans, as amended (e.g. support for frequent transit network service, separate bus lanes, signal systems, queue jumpers).
- p. Increase walking and cycling connectivity and infrastructure at the neighbourhood scale, beginning with the City Centre.
- q. Promote, and where possible invest in, transportation demand management (TDM) measures in new developments and in neighbourhood centres and the City Centre (e.g., car sharing, bike end-of-trip facilities, telecommuting, parking reductions).
- r. Explore the development of policies to support low emission vehicles – hybrids, plug-in electrics, electric scooters (e.g. dedicated premium parking, vehicle plug-ins).
- s. Work with key partners to promote education & outreach programs to support active transportation – walking & cycling (e.g. walking school bus program).



Buildings

- t. Continue to support a high increase in multi-unit residential and mixed use development.
- u. Explore strategic outreach and education opportunities to encourage building owners and users to reduce energy use, reduce solid waste, and invest in renewable on-site energy (commercial, institutional, light industrial and residential).
- v. Explore opportunities for strategic outreach and education for developers, realtors and other stakeholders to promote energy efficiency, passive design and renewable energy technologies and practices.
- w. Explore market-sensitive land use tools to encourage higher performance buildings, passive design and renewable energy. (e.g. Development Permit Areas, streamlining approval of permits, Rezoning, Development Cost Charges, Sustainability Checklist).



Energy Supply

- x. Continue to encourage implementation of district energy in Northeast Coquitlam Village Centre and Waterfront Village Centre (Fraser Mills).
- y. Explore potential opportunities for district energy systems in fast growing Coquitlam neighbourhood centres (both new and existing).

Solid Waste

- z. Support Metro Vancouver efforts to increase recycling and diversion of organic waste through City programs and initiatives.
 - aa. Encourage Provincial and Federal Governments to legislate measures to reduce waste (e.g., extended producer responsibility, product stewardship and reduced packaging).



Air Quality

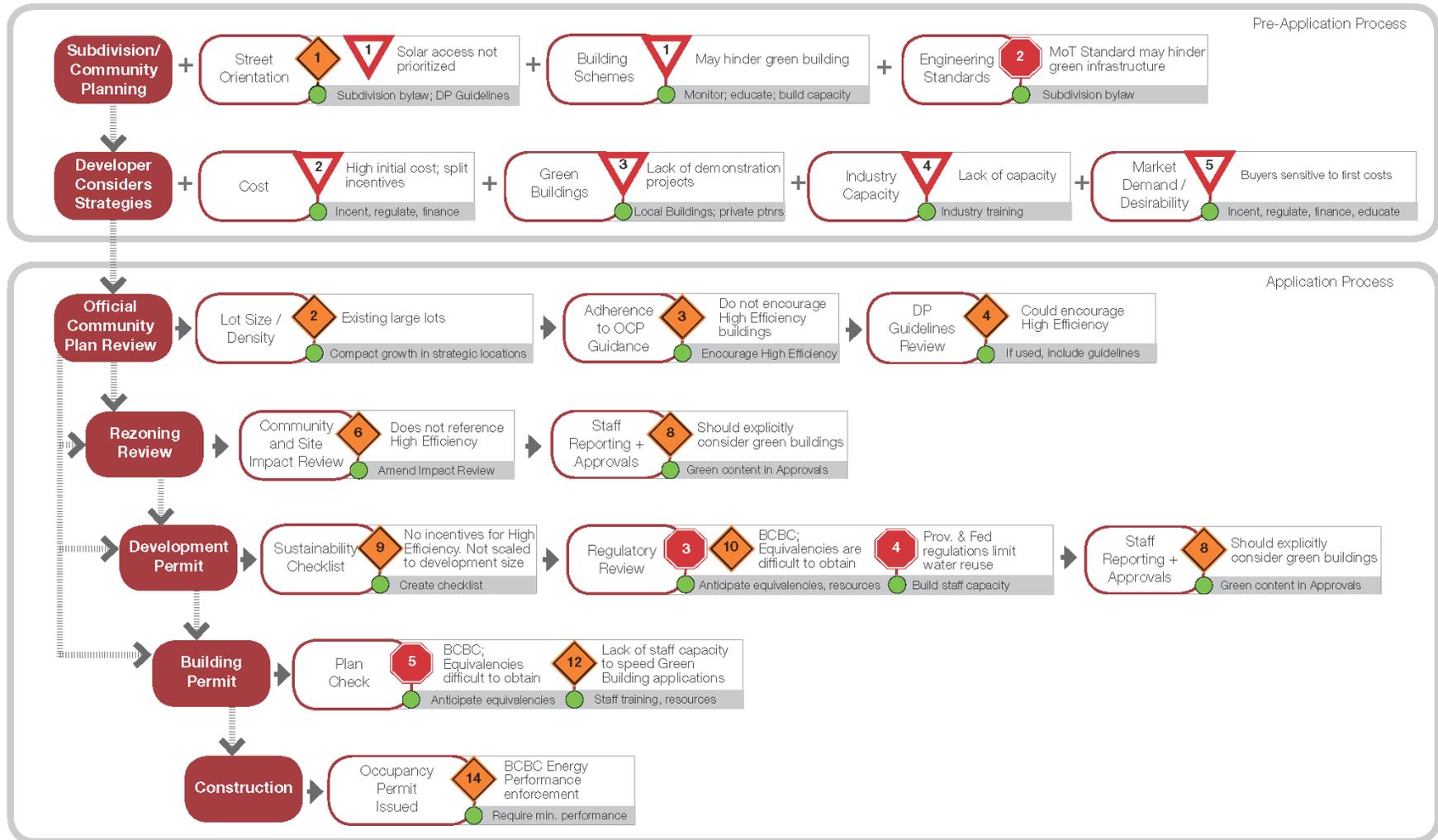
- bb. Recognize the benefits of vegetation and landscaping treatments in improving air quality, and regulating temperature.
- cc. Encourage best practices by construction and other industries to minimize airborne dust and fine particles.
- dd. Continue to support the Metro Vancouver air monitoring program and Air Quality Management Plan (AQMP).
- ee. Continue to learn and benefit from the work of other government agencies, including public education efforts.

Appendix B - Green Building Tools and Opportunities



Figure 1 - High Efficiency Building Barriers and Opportunities Flow Chart.

This illustrative flow chart provides an overview of potential barriers to energy efficient buildings and identifies potential solutions to overcome those barriers. The range of solutions should be evaluated in consideration of costs, efforts, effectiveness and compatibility with other City priorities or processes.



Potential Capacity Building Tools

This matrix identifies a sampling of potential **Capacity Building Tools** the City could evaluate/explore in the future. This is intended as a resource only and does not suggest all tools are appropriate for Coquitlam. Options should be evaluated in light of cost, time, effort and compatibility with other City priorities.

Tools	How Does it work?	Ease of Implementation	Potential Impact	Example of Local Gov'ts
Building Labelling	At point of sale or resale, buildings are labelled with an EnerGuide rating	Moderate Requires partnerships with local realtor board	Low	City of Prince George
Build Municipal Staff Capacity	A wide range of staff (permitting staff, inspectors, planners, engineers) can benefit from training with some unique requirements for each including finance, rating systems, role of internal policy tools	Easy <i>Strategic Considerations</i> - Develop capacity in systems with common barriers (Solar hotwater, geexchange) - Develop capacity with green building certification systems cited in policies (LEED, BuiltGreen, R2000 etc)	Medium	City of Red Deer City of Vancouver RM Whistler
Sustainability Block or Neighbourhood	City and developer collaborate to develop a high sustainability block or neighbourhood that addresses building performance and low carbon energy, as well as sustainable transportation, low waste, sustainable site and location designs.	Moderate to Hard	Moderate -High Can be powerful educational experience for developers, city staff, and broader public.	Town of Banff: Bison Courtyard City of Victoria: Dockside Green RM Whistler: Athlete's Village Vancouver: Olympic Village
Recognition and awards for green building or energy leadership	An award or recognition program is created to recognize local leaders and the buildings they build. An elite program would recognize a small number of builders. An extensive program would recognize more buildings meeting a minimum standard, e.g. EG 82, providing plaques for buildings, seal for building sites, etc..	Easy	Low	City of Toronto City of New York City of San Antonio (Texas)
Training for Building and Development Industry	Builds capacity in different parts of building and development sector in planning, technologies, material sourcing, rating systems. Can focus on new or existing buildings	Moderate <i>Strategic Considerations</i> -Training may not be done by municipality, but a college or in collaboration with utility	Low-High Depends on roll out	Northern Lights College: Solar Thermal Installer Theory City of Vancouver weatherization training BC Hydro and Fortis BC have done some training.

Potential Financial Tools

This matrix identifies a sampling of potential **Financial Tools** the City could evaluate/explore in the future. This is intended as a resource only and does not suggest all tools are appropriate/applicable for Coquitlam. Options should be evaluated in light of cost, time, effort and compatibility with other City priorities.

Tools	How Does it work?	Ease of Implementation	Potential Impact	Example of Local Governments
Property Tax Exemption	Reduces taxes for green developments	Moderate <i>Strategic Considerations</i> - Green building certification standards (LEED, BuiltGreen, etc), or equivalent, are appropriate. - Reduces community revenue	Varies Sometimes little take-up.	
Revolving Fund	A Revolving Fund finances energy efficiency improvements in either new or existing buildings. Loans are repaid from energy savings.	Difficult <i>Strategic Considerations</i> - Requires inexpensive capital for fund - Quality assurance of building programs	High Financing a substantial barrier to green buildings	City of Toronto - Toronto Atmospheric Fund
Local Improvement Charges	An LIC would allow a municipality or a private lender to finance residential or commercial efficiency or renewable retrofits and then make the payback through a charge on the property tax. The LIC would stay with the property rather than the owner. In the US this is called a Property Assessed Clean Energy (PACE) bond.	Difficult <i>Strategic Considerations</i> - Have experience with LICs - Gauge Provincial response	High Financing a substantial barrier to green buildings	LICs under consideration by: City of Dawson Creek City of North Vancouver District of Mission City of Vancouver and other municipalities across Canada.
Development Cost Charge Reductions or Waivers	DCC waivers or reductions are linked to environmental performance as assessed by a sustainability checklist or other means, including proximity to downtown to discourage sprawl	Quite straightforward procedurally but if DCC account is already low or waivers/reductions are already used as incentives elsewhere, unlikely to occur.	Development cost charges are a significant cost to developers so DCC reductions/waivers could provide a significant incentive.	City of Kamloops City of Penticton City of Kelowna

Tools	How Does it work?	Ease of Implementation	Potential Impact	Example of Local Governments
Development and Building Permit Fast Tracking	Reduce approvals time for applications meeting green criteria. - Effective in markets with strong building demand	Easy to Moderate <i>Strategic Considerations</i> - Various fast-tracking protocols exist. Some automated. - Local Governments have multiple priorities. Green buildings must be prioritized to effect market pressure to go green. - Can work in conjunction with a sustainability checklist / Green Building rating system - Changes in file administration processes are needed to ensure that 'green' applications make it to the top of the pile	Medium-High Developers often respond to fast-tracking more than cash incentives, or density bonusing	
Density Bonusing	Provide additional density in exchange for meeting a higher building energy efficiency standard	Easy to Moderate <i>Strategic Considerations</i> - May compete with other density bonus priorities - Set acceptable uplift levels - Develop clear guidelines for development planners to negotiate density bonus - Can work in conjunction with a sustainability checklist / green building rating system	Medium-High Density should be allocated only in appropriate neighbourhoods; compact, complete, alternate transport accessible	City of North Vancouver Density Bonusing

Potential Voluntary Tools

This matrix identifies a sampling of potential **Voluntary Tools** the City could evaluate/explore in the future. This is intended as a resource only and does not suggest all tools are appropriate/applicable for Coquitlam. Options should be evaluated in light of cost, time, effort and compatibility with other City priorities.

Tools	How Does it work?	Ease of Implementation	Potential Impact	Example of Local Governments
Promote and Support the use of Green Building Standards	Provide educational material and/or staff assistance regarding green building programs such as LEED and Built Green.	If staff support is provided, requires resources for staff training or new position.	Low to Medium Will require motivated developer/builder.	City of Vancouver provides an EnerGuide specialist to assist developer (Vancouver requires a higher EnerGuide rating.)
Promote Retrofit Incentives	Promote Federal EcoEnergy Home Retrofit Program. Flyers, workshops, subsidizing home assessments, etc	Easy	High Allows greater energy efficiency gains than affecting new construction. Promotion garners 2 times higher uptake of retrofit programs.	Provide information and/or sponsor workshops: City of North Vancouver District of North Vancouver City of Port Moody Resort Municipality of Whistler
Support 3rd Party Green Loan Programs	Local Governments can partner with lending institutions, to promote existing energy efficiency lending programs	Easy <i>Strategic Considerations</i> - Lending institutions have the capacity to manage loans - Focus on larger buildings; greater capital costs, potential gains, & economies of scale	High Financing a substantial barrier to green buildings	VanCity Savings Credit Union- has been green lending packages for energy retrofits in businesses, stratas and single family homes. RBC Energy Saver™ Loan for Home Renovations
Sustainability or Green Building Checklist	Part of development permitting /rezoning process. If voluntary, has educational value. If mandatory, a minimum score is required. May be associated with incentives.	Easy to Moderate <i>Strategic Considerations</i> - Compatibility regulations/incentive schemes that can be made more stringent over time are important	Varies Checklists without regulations/incentives less effective	City of Port Coquitlam City of Surrey City of Port Moody City of Nelson City of Kamloops District of North Vancouver
Eco-Industrial Park	Zoning and Development Guidelines encourage integrated systems and services; reduces energy, water and resource inputs	Depends on many local factors. Primarily a longer term strategy.	Potentially High Depends on extent and type of local industries.	Hinton, AB, Eco-Industrial Park: Innovista District of North Vancouver: Maplewood
Development and Building Permit Fee Rebates	Return a portion of fees for applications meeting green criteria	Easy to Moderate <i>Strategic Considerations</i> - Works in conjunction with a sustainability checklist / Green Building rating system - Results in lost revenue, unless additional fees are added	Varies Depends on value of rebate. A greater incentive for larger projects, with higher fees	District of Saanich

Potential Regulatory Tools

This matrix identifies a sampling of potential **Regulatory Tools** the City could evaluate/explore in the future. This is intended as a resource only and does not suggest all tools are appropriate/applicable for Coquitlam. Options should be evaluated in light of cost, time, effort and compatibility with other City priorities.

Tools	How Does it work?	Ease of Implementation	Potential Impact	Example of Local Governments
Review Building Related Bylaws - Eliminate Barriers to Green Building	Many bylaws present unnecessary barriers to green buildings.	Moderate <i>Strategic Considerations</i> - Review approvals history; what held up green projects?	Medium -High	City of Vancouver City of Calgary Corporation of Delta
Covenants- Green Building Policy	Register covenants requiring green building performance. Typically at re-zoning or sub-division, especially at sale of Government owned land.	Moderate to Hard Strategic Considerations - If explored, it is important to carefully consider challenges to implement and enforce in relation to potential impact - Requires substantial legal work - Provincial regulations dictate possible provisions. - Use when impact is high (i.e. large subdivision or rezoning)	Medium to High	
Solar-Ready Bylaw	BC pilot underway now. May be voluntarily adopted. Local governments may mandate all new single family dwellings within their communities be solar hot water ready.	Easy Province has prepared content as part of provincial building standards. <i>Strategic Considerations</i> - Considerations related to future 'right to light' or 'solar access'	Medium	
Design Guidelines or Development Permit Area Guidelines	Specify building forms and character, encouraging passive solar design. Specify onsite renewables.	Moderate <i>Strategic Considerations</i> - <i>Local Government Act</i> outlines authority - Consider local environmental conditions (latitude, temperatures, etc). Energy modeling to determine best guidelines appropriate. - Guidelines for different building types (low-rise, high-rise, residential, commercial, high internal heat load, etc) are appropriate, allowing for best passive design applications	Low to Medium Does not address envelope performance and mechanical systems. However passive design can significantly affect energy and emission performance, particularly when combined with on-site renewable energy system.	District of Saanich (Pre Bill 27 where some new authority was granted) District of Tofino (under development)

Tools	How Does it work?	Ease of Implementation	Potential Impact	Example of Local Governments
Compact Complete Communities – OCP Policies	<p>Land use intensity can be increased using land use tools. Smaller unit sizes improve per capita energy performance and various attached forms improve thermal performance. Forms include:</p> <ul style="list-style-type: none"> • Hidden density: laneway housing • Gentle density: row housing • Invisible density: secondary suites 	<p>Depends on many local factors. Primarily a longer term strategy.</p> <p>Strategic Considerations</p> <p>Appeal to community priorities in addition to energy efficiency - healthy neighbourhoods, options for walking or biking, local access to amenities, a range of housing, etc</p> <p>Density needs to be transit/alternate transport accessible.</p>	<p>Very High</p> <p>Probably the greatest impact of any strategies Local Governments can use to advance buildings' energy performance.</p>	