

**Kamloops**

**Community Climate Action Plan**

**Strategic Opportunities**

**October 2019**

Kamloops Community Climate Action Plan

This Strategic Opportunities paper has been produced to support development of a Community Climate Action Plan for the City of Kamloops.



The development of this plan was identified as a key environmental priority in the 2015-2018 Council Strategic Plan.

A cross departmental advisory body is supporting the process, represented by: Glen Cheetham Project Manager and Sustainability Services Supervisor; Josephine Howitt, Sustainability Program Coordinator; Elnaz Ansari, Traffic and Transportation Engineer; Jason Dixon, Building and Engineering Development Manager; Glen Farrow, Streets and Environmental Services Manager; Cara Dawson, Revenue and Taxation Manager; Jason Locke, Community Planning and Sustainability Manager, Adam Chadwick, G.I.S. Manager; Christine Carrelli, G.I.S Technician.

Funding

The City of Kamloops Community Climate Action Plan project is benefitting from the generous support of the Federation of Canadian Municipalities' Municipal Climate Innovation Program, FortisBC's Climate Action Partnership Program, and the BC Hydro Community Energy Manager program and the Energy Step Code Implementation Offer.



Advisors

A team of consultants is advising the City in developing its Community Climate Action Plan. This team completed the Situational Analysis.



Megan Shaw, MCIP

STRATEGIC OPPORTUNITIES OBJECTIVES AND CONTEXT

This report outlines strategic opportunities for climate action that are achievable and implementable generally within a 5-year time horizon. It is important to note that in the context of this plan, these strategic opportunities represent best available (pragmatic, effective and local) potential actions that can be undertaken by the City of Kamloops in conjunction with partners and key local and regional stakeholders. However, these opportunities have not yet been completely crystalized into formal policies and actions, rather they are presented with an eye to refinement especially if they incorporate feedback and knowledge from invested partners. Consequently, a Preferred Path Report will result from this feedback that will then be iteratively strengthened to become the CCAP.

The strategic opportunities in this document are organized into four sectors, supported by a section on cross-cutting institutional priorities and multi-criteria analysis. Key targets will be established for each sector once these opportunities have been formalized into policies and actions.

CCAP Vision

The vision for the CCAP is to develop a plan that is the **key** starting point toward mitigating the production of greenhouse gas emissions (GHGs) in the community, while at the same time promoting a livable and sustainable future for the community.

The resulting objectives for this project are as follows:

- The CCAP must not result in a plan that superficially looks excellent but cannot be implemented in a fulsome way;
- The CCAP must respect and reflect current municipal policies & best practices;
- The CCAP must result in pragmatic outcomes (i.e. reasonable emissions reductions) for Kamloops;
- The CCAP must generate implementable action opportunities;
- The CCAP must foster interest and awareness amongst staff and council and build capacity from creation to implementation

Bearing in mind the above-mentioned project objectives, the development process for each of the strategic opportunities was informed by the following high-level design criteria:

- Strategic opportunities must be pragmatic. That is to say each opportunity must be grounded in the Kamloops policy context and result in actionable possibility, as opposed to theoretical opportunity;
- Strategic opportunities should typically not focus on “silver bullet” technologies to achieve climate action. Rather opportunities should reflect existing policies and actions and effort should be spent refining or enhancing them where necessary to achieve practical outcomes;
- Strategic opportunities must generally be actionable at the municipal level and will leverage local and regional stakeholders, as appropriate;
- Strategic opportunities must contribute to Kamloops’ liveability and resilience and reinforce core community priorities;
- Strategic opportunities will be designed with a “jump-start” philosophy in mind, such that most resulting actions can be reasonably executed within a five-year time horizon from plan implementation;
- Strategic opportunities should provide a basis for clear short and long term GHG reduction targets and benchmarks to satisfy provincial legislative requirements, and support implementation and monitoring; and
- Strategic opportunities should inspire residents, stakeholders and implementation partners

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## BAU BACKGROUND

The emissions reduction potential of this plan is most meaningful when energy and emissions forecasts are compared to Business as Usual (BAU) as a baseline case. Energy and emissions under the Business as Usual Future assume policy and planning will incorporate measures envisioned in the recent Official Community Plan and Transportation Master Plan and that pace of development will continue according to the historical trend with no dramatic measures to manage carbon and energy. Detail on these assumptions is outlined in the previously developed situational analysis document.

Under the BAU Scenario, total GHG emissions decline 6% by 2039. The decrease is primarily due to the introduction of new provincial policies, which will steadily increase the share of personal zero emission vehicles (ZEV), i.e. electric vehicles (18% of fleet ZEV by 2039, 40% by 2050). Emissions in the other two major sectors (buildings and solid waste) actually increase under the BAU projection.

Compared to the BAU, community-wide emissions could drop by 15.2% by 2039 (equal to a reduction 21.1% over the 2017 and 27.7% over 2007<sup>1</sup>) with continued senior government action on improving building performance and vehicle emission standards, continued utility support of energy conservation programs, and implementation of the CCAP. Of this 15.2% reduction, continued senior government and utilities action beyond 2019 would be responsible for only a fraction of these reductions as most strategic opportunities should be the results of local actions. If both senior government policies (Step Code, CleanBC, lower carbon intensity natural gas) and CCAP opportunities are implemented, it is expected that Kamloops' current and potential actions could achieve XX%<sup>2</sup> in emission reductions from 2017. These reductions are even more significant when taking into account the rapid employment and residential growth expected in Kamloops over the lifespan of the CCAP.

Many strategies within and between sectors are mutually reinforcing. To quantify their energy and emissions impact, related strategies are aggregated into emissions reduction wedges (see figures on following pages). Most strategies and, in turn, emissions reduction wedges are influenced by City of Kamloops actions.

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## STRATEGIC OPPORTUNITES

The CCAP strategic opportunities include the following:

- Potential medium-term changes to growth management, which will be built on the City's excellent transportation and land use policy and planning work completed to-date;
- Transit infrastructure improvements, improved bus service, increasing access to school bus service and infrastructure increasing availability of bike infrastructure, which should increase transit use, reduce congestion, support safe and cost-effective transport, and promote physical fitness, complementing the City's growing active transportation investment;
- Building energy retrofit strategies to reduce energy spending, support housing affordability and potentially create jobs;
- A suite of green car strategies to support low emission vehicles, vehicle electrification and car sharing;
- A framework to meet the challenge and opportunity of BC Step Code, delivering long term energy savings to homes and businesses, and improved building durability and occupant health and comfort; and
- Guidance to build a city's zero organic waste.

**Land Use Strategic Opportunities** aim to open the conversation with regards to:

- The potential for medium-term focused residential and commercial growth in the Core area of the City, as well as key nodes;
- Regulation of greenfield development as it pertains to buildings' energy efficiency and EV readiness; and
- The diversification of building stock especially with regards to the provision of new housing forms.

These opportunities have been developed such that, once implemented, they should support transit use, active transportation, higher efficiency buildings, low-carbon lifestyles, and overall liveability. The objective of these opportunities is to set the foundation for sustainable land use that supports and enables strategies in other sectors.

**Strategic opportunities:**

- Smart land use
- Hidden Housing Solutions
- Gentle intensification

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<sup>1</sup> Note that 2007 inventory value still requires confirmation and calibration per Climate Action Secretariat communication October 4, 2019  
<sup>2</sup> To be calculated during phase 3 of the project. The current estimate is around 50% of reductions can attributed to Kamloops directly.

**Transportation Strategic Opportunities** build on land use strategies to support a high-quality transit network, extensive active transportation infrastructure, diverse low emission vehicle opportunities for residents and businesses, as well as the general reduction in single occupancy vehicle usage. The objective of these strategies is to accelerate a transition to attractive, low carbon transportation options.

**Strategic opportunities:**

- Transit Network Enhancement
- Improved Cycling Infrastructure
- Kamloops Car Share
- Expanded School Bus Service
- Electric Vehicle Adoption
- Zero Emission Buses
- City-Wide Transportation Demand Management

**Building Strategic Opportunities** aim to enhance the capacity of City staff and Kamloops’ construction industry to meet and/or exceed steadily rising provincial building standards (per Clean BC) and to increase energy retrofit rates in residential Part 9 and commercial Part 3 buildings. The objective of these strategies is to improve the energy and GHG emissions performance of new and existing buildings, as well as leverage best practices from the institutional sector.

**Strategic opportunities:**

- Moving to Net Zero New Buildings
- Thompson Rivers University (TRU) Carbon Neutrality
- Building Modernization

**Solid Waste Strategic Opportunities** enhance existing policies and plans to virtually eliminate organics from landfills, as well as manage landfill gas more effectively and potentially prepare Kamloops to extract renewable natural gas in the medium to long-term time horizons.

**Strategic opportunities:**

- Zero Waste
- Landfill Gas Management

Emissions Reductions Overview

Based on modeling completed during this phase of the project, the following graph indicates the relative contribution<sup>3</sup> of each strategic opportunity to emissions reductions from the BAU scenario.

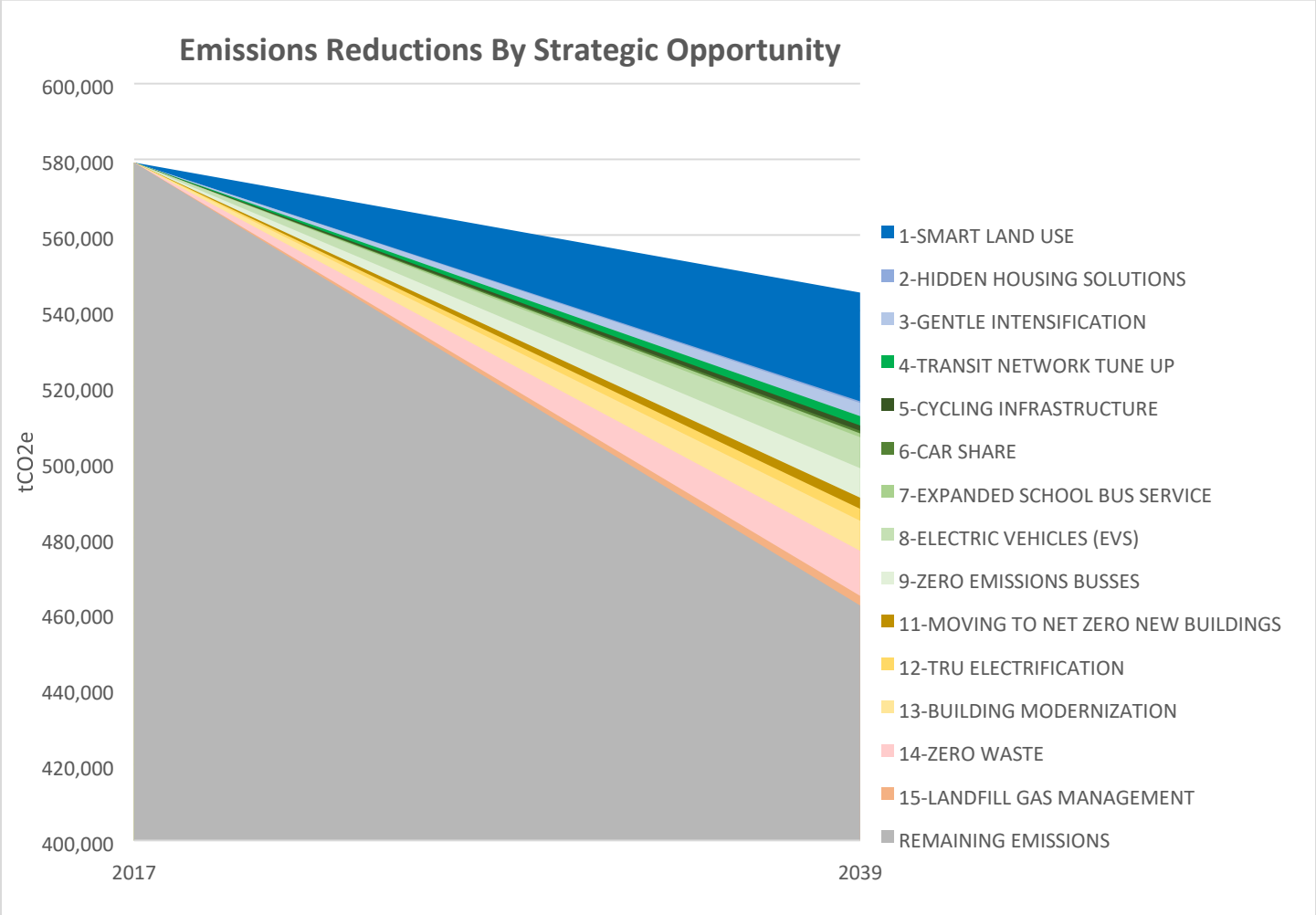


Figure 1 - Overall Emissions Reductions by Strategic Opportunity

<sup>3</sup> Note that the graph has been truncated to 400,000 tCO<sub>2</sub>e for ease of interpretation

LAND USE STRATEGIC OPPORTUNITES

Presented for reference, are the community totals which generally comprise the effects of Land Use Strategic opportunities. Following these graphs are flysheets which detail the assumptions and outputs from these opportunities.

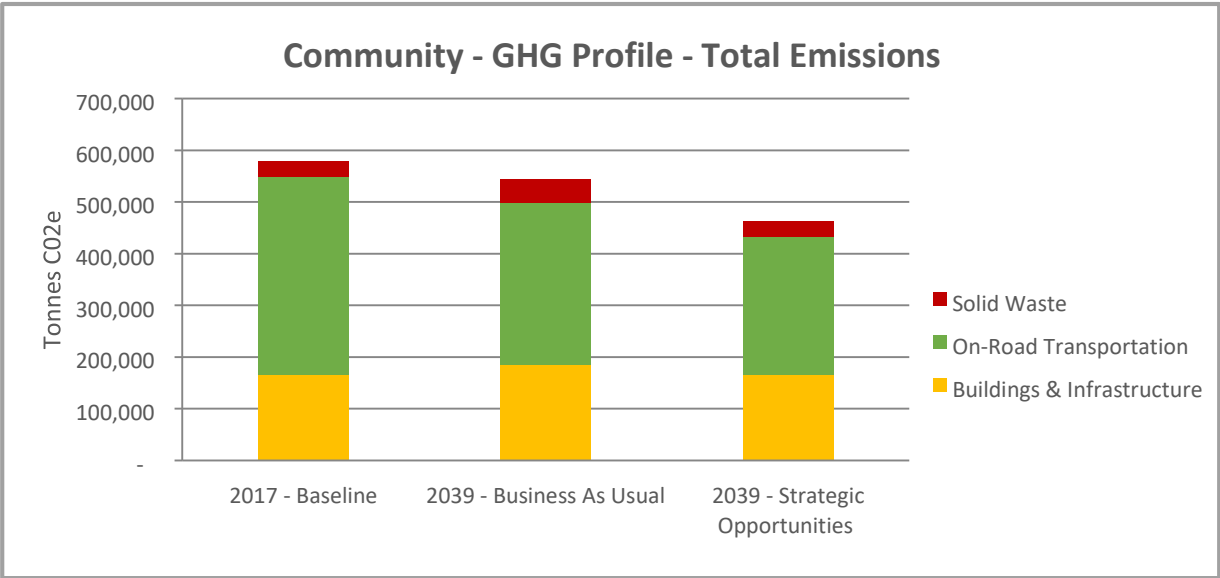


Figure 2 – Total Community Emissions 2017 - BAU - Strategic Opportunities Comparison

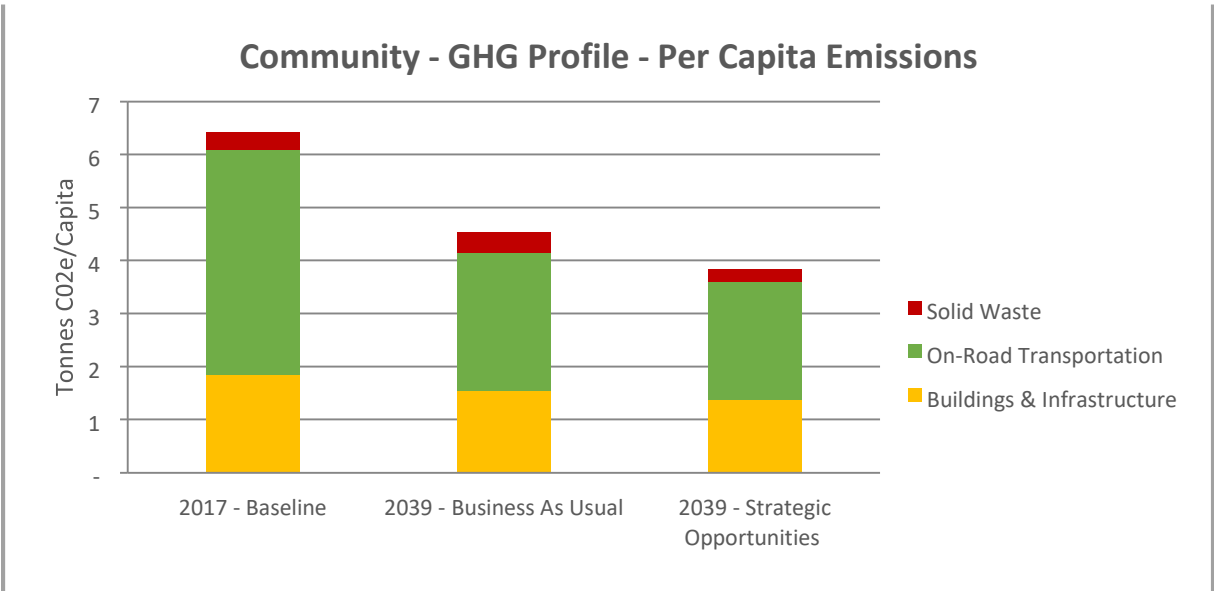


Figure 3 - Per Capita Community Emissions 2017 - BAU - Strategic Opportunities Comparison

DESCRIPTION

Residential urban growth policies can have significant effects on both energy use and emissions. Compact urban form supports shorter commutes and other personal transportation trips, the largest source of community greenhouse gas emissions. Compact urban form typically has a larger share of multi-family dwellings which tend to be more energy efficient due to shared walls and smaller square footage.

Demographic change, economic development and City planning trends are supporting increased residential development in Kamloops’ downtown core.

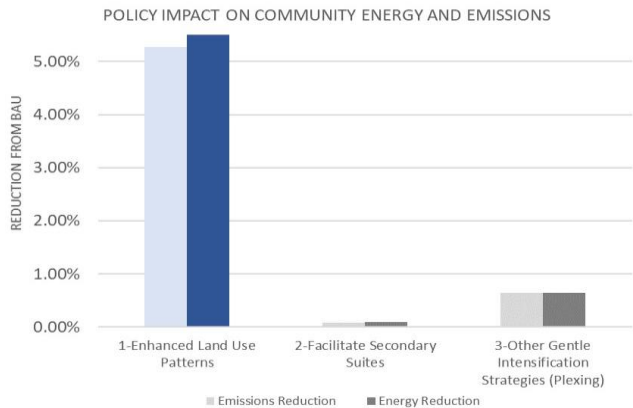
This strategic opportunity explores the implications of intensifying growth in the core and slowing growth in high GHG areas in the urban periphery, after the OCP five-year review in 2024.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy Use: 11,500,000 GJ/yr	Reduction: 622,000 GJ (5.5% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 28,000 tCO2e (5.2% reduction from BAU)



CO-BENEFITS

- ➔ 10.5% reduction in total distances travelled across the community (VKT), and equivalent transport GHG reductions
- ➔ Lower civic infrastructure servicing costs.
- ➔ Lower fire interface risk with a 5% reduction in the City’s residential footprint.
- ➔ Reduces congestion.
- ➔ Reduces building GHGs by increasing the share of multifamily homes.
- ➔ More dwellings (17.2%) are in highly walkable areas.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity*
Residential Growth Allocations at 2039 <ul style="list-style-type: none"><li>• 20% Core</li><li>• 18% Northwest</li><li>• 0% Northeast</li><li>• 19% Southeast</li><li>• 43% Southwest</li></ul>	Residential Growth Allocations at 2039 <ul style="list-style-type: none"><li>• 28% Core</li><li>• 18% Northwest</li><li>• 0% Northeast</li><li>• 18% Southeast</li><li>• 36% Southwest</li></ul>

ACTORS AND ACTIONS

- ➔ KAMPLAN 2017, Aberdeen Area Plan (2008), North Shore Plans, Downtown Plan (2019), Kamloops Provincial Government Precinct Plan (2020)
- ➔ Developers, building associations, real estate institute

IMPLEMENTATION CONSIDERATIONS

- ➔ Given the recently adopted OCP, this full strategy may be delayed until the next OCP update. On the short-term, this opportunity could inform the shape and phasing of new neighbourhood plans. Delaying adoption will result in higher GHGs.
- ➔ As well as significant GHG reductions, this smart land use opportunity would accrue benefits to public health, forest fire risk management, and avoided congestion and civic infrastructure costs, reducing tax/utility burdens.
- ➔ Outreach to the community, builders and developers can help foster awareness of the trade-offs and benefits with enhanced land use

NOTES

- ➔ \* Assumes strategic opportunity is phased in at 2024
- ➔ Land use modeling does not take into account additional GHG savings from other transportation initiatives such as transit service prioritization, TDM measures or vehicle electrification.
- ➔ Land use modeling does not take into account additional building energy demand management policies.
- ➔ Emissions reductions account for reduced personal vehicle travel and a higher share of multifamily over single detached homes.
- ➔ Strengthens the business case for car share and Transportation Demand Management Strategies.
- ➔ See technical appendix for additional detail on the assumptions of new growth in the City



DESCRIPTION

In addition to addressing affordability and housing for aging parents and children and students, secondary suites are a straightforward GHG reduction strategy, reducing floorspace per occupant, notably in the large and rapidly growing share of 1 and 2 occupant single family homes.

With the recently adopted Residential Suite Compliance Policy, secondary suites are now legal across all urban areas of the City. This bylaw permits construction of additional suites in existing single-family areas and will monitor uptake. Up until 2018, Kamloops issued about 25 secondary suite permits per year.

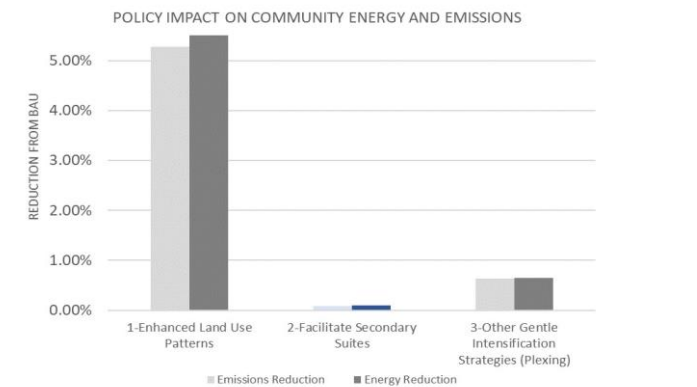
This strategic opportunity explores the implications of requiring new single and semi-detached homes to be secondary suite ready by 2024 and permitting up-to-two accessory dwelling units per single family home along good transit corridors and in and around commercial areas and TRU (e.g. a ground floor suite and laneway home).

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 632,000 GJ (0.09% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 400 tCO2e (0.08% reduction from BAU)



CO-BENEFITS

- ➔ Better housing options for Kamloops’ demography.
- ➔ Improves affordable rental, generating 1,900 units by 2039.
- ➔ Creates housing options for changing family needs.
- ➔ Increases affordability of ownership with revenue stream.
- ➔ Reduces need for greenfield development.
- ➔ Increases efficiencies of existing civic infrastructure.
- ➔ Increases efficiencies in energy use for buildings.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>• As the business as usual was developed in advance of the current secondary suites bylaw, suites were assumed to be selectively legal across the City.</li></ul>	<ul style="list-style-type: none"><li>• All new single detached dwellings secondary suite ready*</li><li>• Single detached dwellings near transit and commercial/TRU permit 2 ADUs*</li><li>• 0.5% of single-family dwellings converted per year.</li><li>• 5% of all new medium and large SFD will have suites.</li><li>• Up to 25% of single detached homes in newly developed areas have secondary suites by 2039</li></ul>

ACTORS AND ACTIONS

- ➔ City of Kamloops: KAMPLAN, Neighbourhood Plans, Downtown Action Plans, Zoning
- ➔ Kamloops Secondary Suite Bylaw
- ➔ Builders, developers, neighbourhood associations, housing advocacy groups

IMPLEMENTATION CONSIDERATIONS

- ➔ To improve renters’ living quality, the City can encourage sunken patios for new and existing secondary suites.
- ➔ BC Building Code has secondary suite requirements, including: size, ceiling height, fire safety, HVAC, plumbing.
- ➔ Reducing off-street parking requirements will increase uptake. This may start in areas with good access to transit and commercial activity or TRU.
- ➔ Notwithstanding the promotion of secondary in greenfield developments, suites in neighbourhoods far from the core and TRU will have high transportation emissions and should be accepted for affordability reasons but not encouraged over other permit applications.
- ➔ Discounted or free permits could be issued to accelerate uptake.
- ➔ Growth in short term rental market (Air B&B) should be monitored and managed if undermines affordable rental.
- ➔ An informal checklist should be prepared to underscore what is required to prepare new developments for secondary suites

NOTES

- ➔ \* Assumes strategic opportunity is phased in at 2024
- ➔ Existing non-permitted suites are assumed legalized over first few years and are considered in uptake.
- ➔ Some units may have two accessory units

DESCRIPTION

Traditional single-family zoning doesn’t permit the housing choices demanded by current and future populations, notably the share of 1, 2 and 3 person households and seniors. Gentle intensification of single-family neighbourhoods through “plexing” can enhance affordability and sustainability while maintaining character.

Much like the recently approved secondary suites policy, these strategic opportunities would incorporate additional units into single family lots without increasing allowable floor area. Such units could take the form of duplexes, triplexes, or fourplexes, carriage homes, or tiny homes. They could be used for rental income by the existing homeowner, developed as strata units, or operated as rentals by organizations such as seniors’ groups.

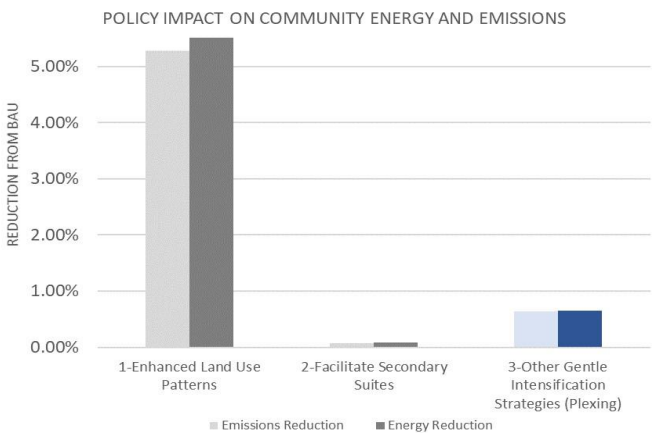
These “plexing” housing options could be incorporated into existing homes, but would be more common on an expanded suite of new construction options.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 73,000 GJ (0.65% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions 545,000 tCO2e/yr	Reduction: 3,500 tCO2e (0.64% reduction from BAU)



PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>• No current policy for “plexing” single-detached dwellings.</li></ul>	<ul style="list-style-type: none"><li>• 0.15% per year of SFD converted to 2 – 4 units, average 3 units.</li><li>• 20% of all new medium and large SFD will be built as multi-unit building from 2 – 4 units, average 3 units.</li></ul>

ACTORS AND ACTIONS

- ➔ City of Kamloops: KAMPLAN, Neighbourhood Plans, Downtown Action Plans, Zoning
- ➔ Builders, Developers, Neighbourhood associations, Housing advocacy groups

IMPLEMENTATION CONSIDERATIONS

- ➔ Focus gentle intensification around core and transit routes; restrict in peripheral areas, minimizing transport GHGs
- ➔ Floor area of new multi-unit homes could be restricted to the current SFD floor allowance, thereby easing concerns about “monster” homes.
- ➔ Some 3-4 unit plexes may require larger lots and development permits.
- ➔ Adjust off-street parking requirements by area, e.g. minimizing in commercial/TRU areas.
- ➔ New plexes will offset construction of other dwelling types notably new townhomes and apartments. Unlike secondary suites, home-plexing can create 3 new high-performance dwellings at the expense of one older single detached structure, improving energy and GHG performance.
- ➔ Plexes may be better suited for downtown with laneways, will also depend on neighborhood.
- ➔ Implementation of these units may be informed by the experience resulting from the first few years of secondary suite legalization.

CO-BENEFITS

- ➔ Maximizes existing civic infrastructure and reduces servicing cost compared to greenfield.
- ➔ Improves business case for transit and cycling
- ➔ Adds to vibrancy in neighbourhoods.
- ➔ Increases rental availability and thus housing affordability.
- ➔ Creates potential revenue stream for homeowners.
- ➔ Provide housing choice (ex. extended families).
- ➔ Untapped area for affordability/climate action synergies to retrofit/lease/manage plex units on behalf of seniors confronting social isolation.

Please refer to the following summary with regards to the effects of energy and emissions reductions from transportation emerging opportunities.

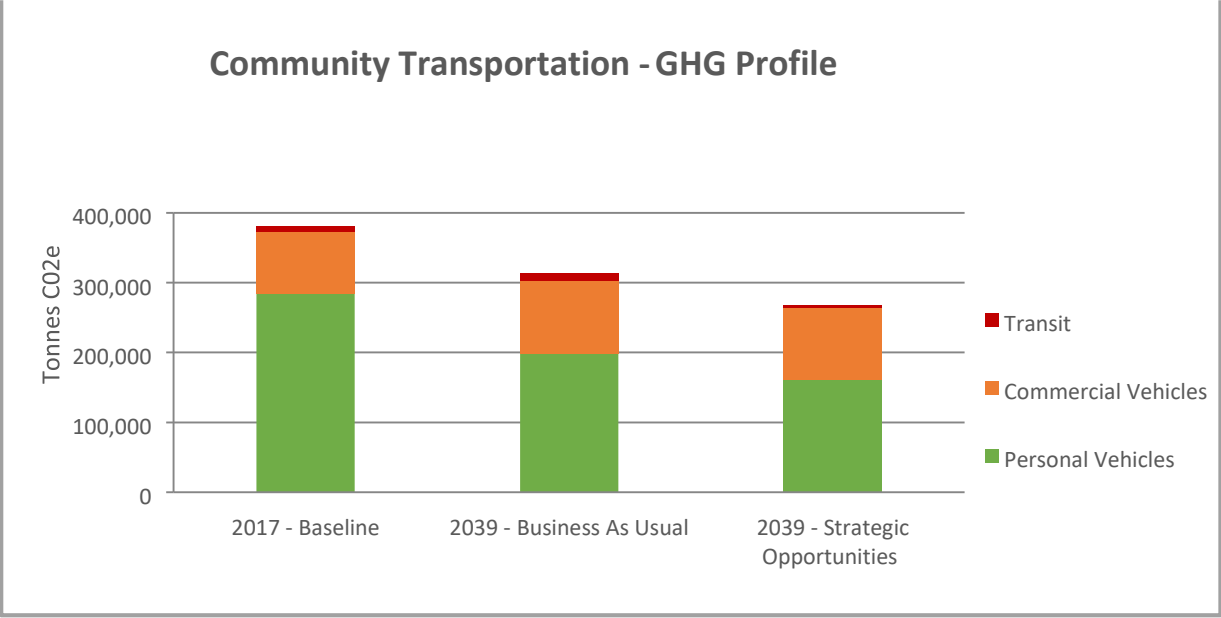


Figure 4 - Transportation Emissions Summary 2017 - BAU - Strategic Opportunities

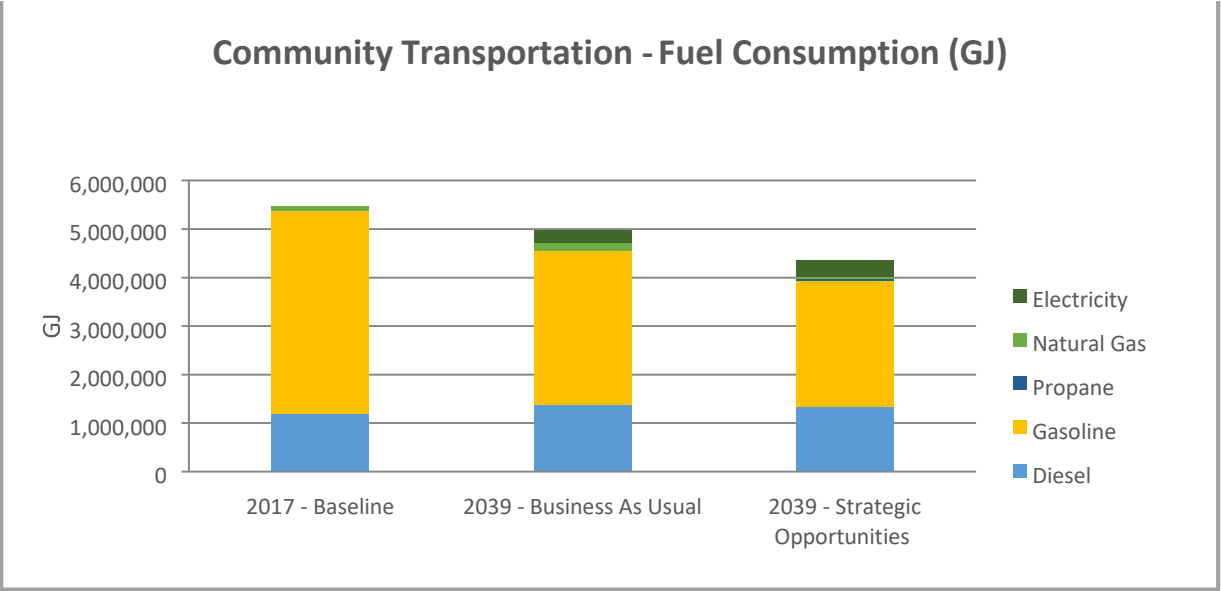


Figure 5 - Transportation Fuel Consumption Summary 2017 - BAU - Strategic Opportunities

DESCRIPTION

Substantial increases in transit access (i.e. through better land use) and transit service supports mode shifting from energy intensive personal vehicles into more efficient busses.

However, for effective transit to become a reality in Kamloops significant increases in service must be paired with effective densities along routes and for service levels to present a level of competitiveness with the personal automobile.

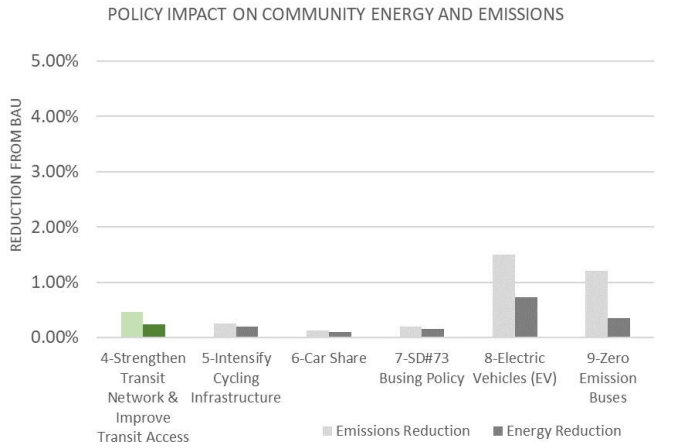
The intent of this strategic opportunity is to optimize transit service to the community’s land use as well as increase transit frequency in areas of increased population and employment densities.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 27,761 GJ (0.25% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 2,500 tCO2e (0.46% reduction from BAU)



CO-BENEFITS

- ➔ This policy could remove 1,950 cars from Kamloops roads by 2039, reducing traffic along major arterials.
- ➔ This strategy increases transit cost effectiveness, dramatically cutting the cost of per passenger boarding.
- ➔ Total annual driving distances would be reduced 1% with this policy, the equivalent of 220,000 hours of driving time or \$1.5m in annual savings for Kamloops’ drivers by 2039.
- ➔ A shift from driving to transit also encourages walking as residents and employees walk to transit stops.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
• Double transit service provision 2039	• Increase transit around intensified corridors, hubs and nodes, reduce transit frequency in suburban areas. Result is an additional 15% increase in transit service provision by 2039.

ACTORS AND ACTIONS

- ➔ Corresponds to Transportation Master Plan KPI 2 Transit (Ridership), Transportation Demand Management Strategy, KAMPLAN, Neighbourhood Plans, Downtown Plan
- ➔ BC Transit, Development community, Seniors associations, TRU student associations

IMPLEMENTATION CONSIDERATIONS

- ➔ The City can increase transit use with well-designed, mixed use, transit-oriented development (TOD) around hubs and nodes with good transit service. Effective TOD can cut trips significantly relative to standard development.
- ➔ In FY2019 there has been funding increases for both active transportation and for transit. However, Annual funding increases are not guaranteed for transit; though, in the past few years, there have been service expansion increases, and this is expected to continue in the short term.

NOTES

- ➔ While there was a large increase in transit service under the BAU, it was not necessarily tied to new population and employment distributions at a granular level. With this strategic opportunity, these areas could benefit from increased service to meet increased demand.
- ➔ Based on preliminary modeling, when service increases were better matched with employment and residential density, this is a 10% increase in transit passenger km traveled over the baseline.

DESCRIPTION

Increasing cycling mode share reduces GHGs, congestion, and personal and public transportation costs, while improving public health. Increasing the cycling mode share requires investment in infrastructure to increase the safety and appeal of cycling for additional users.

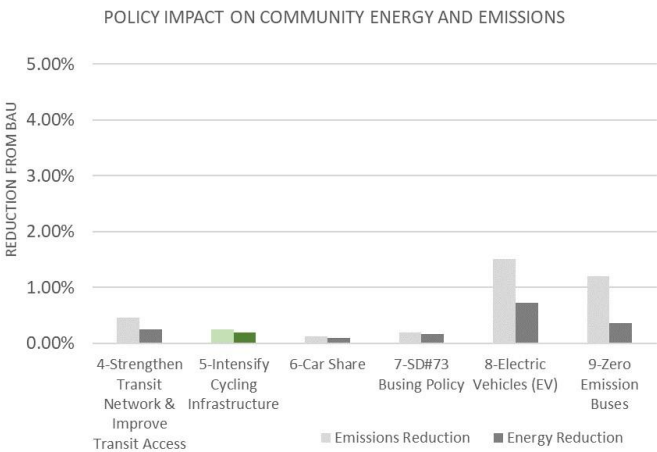
In the Business as Usual (BAU) future there will be a substantial increase in cycling infrastructure according to the Transportation Master Plan. This strategy tests the amount of additional gains to be made from further increasing bike lanes and associated cycling infrastructure, and end-of-trip facilities above and beyond what is already called for in the Transportation Master Plan.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 22,286 GJ (0.20% reduction from BAU)

EFFECT ON EMISSIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 1,350 tCO2e (0.25% reduction from BAU)



CO-BENEFITS

- ➔ Total annual distances driven across the community will be reduced 0.3% under this policy which is the equivalent of 75,000 hours driving time or approximately \$0.5m in annual savings for Kamloops’ drivers by 2039 (in 2019\$).
- ➔ The health and well-being benefits of increased cycling activity are significant and well documented.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>• Increase the percent share of Active Transportation (AT) Infrastructure to 33% by 2039</li></ul>	<ul style="list-style-type: none"><li>• Active Transportation mode share to 38% by 2039. This would require an increase of 15% in linear cycling infrastructure and increased investments in end-of trip facilities</li></ul>

ACTORS AND ACTIONS

- ➔ Transportation Master Plan (Corresponds to KPI 3 Active Transportation Infrastructure), Transportation Demand Management Strategy, Bicycle Master Plan
- ➔ KAMPLAN, Downtown Plan, Neighborhood plans
- ➔ Kamloops EV and Electric Bike Strategy
- ➔ Cycling associations, neighbourhood associations

IMPLEMENTATION CONSIDERATIONS

- ➔ The greatest potential for mode shifting is by establishing separated bike infrastructure between med to large concentrations of people and jobs (<5-10 km). Due to limited right of way in corridors throughout the city, the construction of separated bike infrastructure (i.e. Triple A - All Ages and Abilities Infrastructure) may require the loss of other existing facilities.
- ➔ End of trip facilities should be promoted at all commercial and institutional buildings: safe, secured, weather protected bike parking. Showers and lockers for commercial buildings with more than 10,000 sq.ft. and added in any major renovation to an ICI building.
- ➔ Cycling opportunities should be co-located with alternate modes of mobility such as car-share and transit to provide a full spectrum of lower cost, low carbon alternatives.
- ➔ Investing in cycling infrastructure is amplified by an effective Transportation Demand Management strategy and increased transit services.
- ➔ Financing can be supported by development cost charges, amenity contributions and provincial grants.
- ➔ Good active travel infrastructure is required and paid for through DCCs in all greenfield developments and is also paid for with all building replacements anywhere (commercial/residential).
- ➔ Impact analysis should be integrated into development and long-range planning to validate anticipated behavior shifts.
- ➔ As of FY2019, Council has approved additional funding for active transportation, therefore current trends support more aggressive project implementation in the short term.

DESCRIPTION

Car sharing reduces emissions, improves affordability by reducing vehicle ownership costs, and supports multi-modal transportation systems.

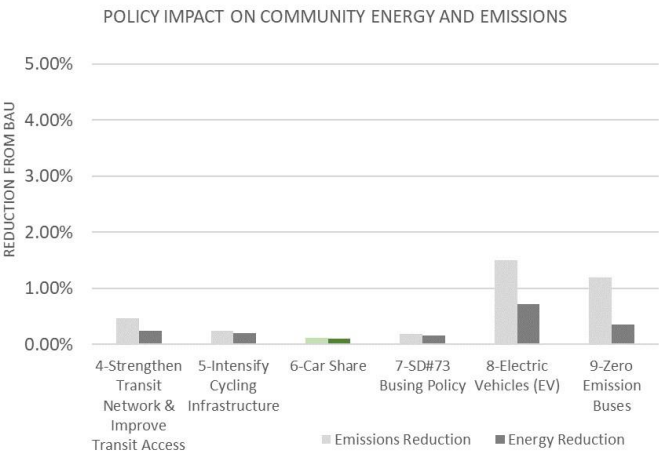
This strategy envisions the development of a city-wide carshare program based on a successfully implemented program in Kelowna (Modo Car Sharing).

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 11,100 GJ (0.10% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 700 tCO2e (0.13% reduction from BAU)



CO-BENEFITS

- ➔ Annual VKT will be reduced by 0.33% under this policy which is the equivalent of 81,500 hours spent driving or approximately \$0.5m in annual savings for Kamloops’ drivers by 2039 (in 2019\$).
- ➔ Improves use of other modes of transportation (i.e. increased walking, cycling, transit)
- ➔ Can reduce parking requirements as an incentive.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>• Limited options to encourage multimodal transport.</li></ul>	<ul style="list-style-type: none"><li>• By 2039 it is estimated that there will be approximately 42 car share vehicles located in Kamloops which at current levels of vehicular reduction would result in 580 fewer privately-owned vehicles in the City.</li></ul>

ACTORS AND ACTIONS

- ➔ Transportation Master Plan, Transportation Demand Management Strategy, KAMPLAN, Downtown Plan,
- ➔ Modo Car Sharing Co-Op or other car sharing organizations
- ➔ TRU, major employers, potential local grass-roots organization or individuals

IMPLEMENTATION CONSIDERATIONS

- ➔ Car sharing is not a catalyst for, but an *effect of* a reliable multi-modal transportation system.
- ➔ Car sharing typically follows or grows with the improvement of other measures, such as complete, compact development, improved walkability, better transit service, and cycling infrastructure investments.
- ➔ Car sharing needs a strong local advocate to drive the growth in order to be successful.
- ➔ City could become initial downtown anchor by shifting a share of its fleet to car share. This may be very effective as many car share users in downtown are seeking vehicle use in evening and weekends, mirroring City requirements.
- ➔ This strategy has proven very cost effective for some other municipalities. It can be scaled, starting with several vehicles.
- ➔ Municipalities can help drive sustainable business models by selling or providing vehicles at low cost (if underutilized), committing to subscription and usage minimums, providing membership to employees for use. This also helps to normalize car sharing.
- ➔ Municipal regulations can encourage participation through increased parking costs, decreased parking spaces, etc.) and encouraging car-share parking spots.
- ➔ Strong parking policy support and incentives for developers to integrate car share into developments have made Cities of North Vancouver and Vancouver amongst the top car sharing cities in North America.
- ➔ A parking management study may inform this policy in the short-term



DESCRIPTION

This strategic opportunity evaluates the impact of extending school bus service to cover students who live further than 1.6 km from school. Currently, students are bussed to local schools if they live farther than 4km away for grades K-3 and 4.8km away for grades 4 and up. It is assumed that most children will not walk or ride to school beyond a convenient distance. As such, these students are likely driven to school, which will commensurately increase VKT.

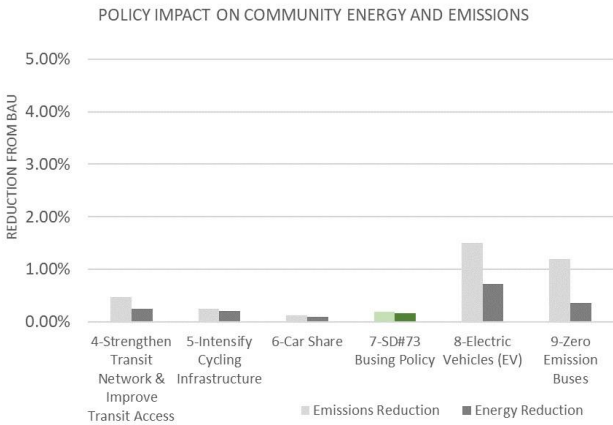
This strategic opportunity is expected to displace 1% of personal vehicular kilometres traveled with 40 school busses based on an average load capacity of 54.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 18,100 GJ (0.08% reduction from BAU)

EFFECT ON EMISSIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 1,000 tCO2e (0.20% reduction from BAU)



CO-BENEFITS

- ➔ Annual VKT will be reduced by 0.35% under this policy which is the equivalent of 85,000 hours spent driving or approximately \$0.55m in annual savings for Kamloops’ drivers by 2039 (in 2019\$).
- ➔ Reduced congestion and emissions, especially in school zones
- ➔ Health impacts from walking school bus-type activities are well documented and would be appropriate for the Kamloops context.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>• Primary students walk limit of 4km.</li><li>• Other students (Grades 4 to 12) walk limit of 4.8km to school or 3.2km to a school bus stop</li></ul>	<ul style="list-style-type: none"><li>• Reducing walk limits to 1.6km.</li><li>• Walking school bus for less than 1.6km.</li></ul>

ACTORS AND ACTIONS

- ➔ SD 73 School Bus Policy
- ➔ TMP and TDM Strategies
- ➔ SD 73, PACs
- ➔ Parents of school aged children K-12

IMPLEMENTATION CONSIDERATIONS

- ➔ School bus policy is outside the City’s jurisdictions, but the benefits to reduced GHGs and traffic congestion might make this policy worth pursuing by SD73 with City support.
- ➔ This is challenging to model and would require further feasibility analysis but the concept is very promising.
- ➔ This strategy requires further feasibility analysis to understand whether the service will be used if it is offered. Parents may prefer to drive their children.
- ➔ This strategy may be complemented by a walking school bus program for residents living within 1.6km of their schools
- ➔ There is a need to understand appetite for enhancing complementarity of transit/school bus services. E.g. children using public transit and public using school buses.

NOTES

- Approximately 10% of school aged children would be affected by this policy.
- This analysis assumes that parents currently drive their children to the nearest school approximate 80% of the time. The remaining 20% of parents are assumed to travel to a random school of choice.
- This analysis assumes that parents currently work probabilistically in locations with high employment densities. Work location trips have been informed by the City’s EMME origin destination matrix.
- Enrolment by school by postal code would greatly facilitate the modeling of this strategic opportunity.

DESCRIPTION

The electrification of vehicles presents a significant opportunity for the City of Kamloops to reduce community GHG emissions. The province’s recent CleanBC policy direction has mandated that all new vehicles sold in BC be Zero Emission by 2040, which is the life of this plan. The BAU had a conservative uptake estimate of 31% by 2039. To increase EV penetration rates in Kamloops, the City could implement a number of different policies including:

- Develop a local EV charging network strategy in consultation with BC Hydro and FortisBC,
- Map optimal EV charging locations across the community.
- Deploy public EV chargers in strategic locations
- Require chargers in all types of new buildings and strategically phase in existing buildings
- Promote senior government incentives and explore enhancing these incentives with partners
- Incentivize private businesses to provide EV chargers
- Utility partnerships and planning.
- Guidance for fast chargers in lower density residential
- Co-ordinate with key players in destinations beyond the City (e.g. Merritt, Sun Peaks)
- Integrate EV and Car Share strategies into on-street and off-street parking bylaws, providing incentives and priorities to #1 carshare users and #2 EV owners

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 82,000 GJ (0.73% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 8,200 tCO2e (1.50% reduction from BAU)

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>• No City EV policy</li><li>• BAU assumes 31% of new sales are EVs by 2039</li></ul>	<ul style="list-style-type: none"><li>• Assumed that City policy actions could drive up EV penetration rates from 31% to 34% by 2039 and from 50% to 60% by 2050</li></ul>

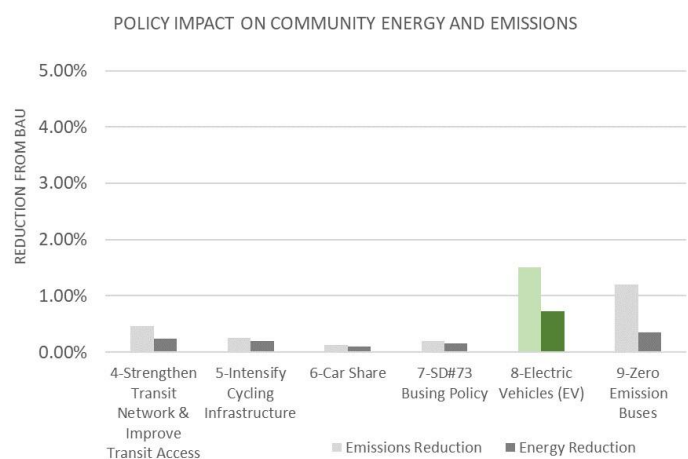
ACTORS AND ACTIONS

- ➔ KAMPLAN, Neighbourhood and DP Area Plans, Downtown Action Plans.
- ➔ EV Jumpstart strategy, City-wide EV strategy
- ➔ Ministry of Transportation and Infrastructure, BC Hydro, FortisBC
- ➔ Local automobile retailers, Electric vehicle owner groups

IMPLEMENTATION CONSIDERATIONS

- ➔ It would be appropriate to evaluate the potential for a “standard” EV charging strategy and an “enhanced” with added provincial support (as current provincial program doesn’t sufficiently enable local governments to help deliver on the EV charging infrastructure roll out.
- ➔ Additional research and planning is required to drive this agenda forward. Drawing the linkage between EV infra-network coverage, ZEV incentives such as free parking or non-permitting parking and reductions in range anxiety would assist in determining the functionality of this policy.
- ➔ A suggested target would enable convenient access to minimally L2 charging station infrastructure at key commercial and recreational destinations and some L3 at key destinations.
- ➔ There may be some BC Hydro or FortisBC support for helping develop a strong network plan.
- ➔ The local EV Strategy should be coordinated with the car share strategy
- ➔ The BC Government has taken significant leadership on personal EVs. Successful penetration of personal EVs requires much more robust policy, planning and governance, notably providing resources to local governments to plan regional EV charging infrastructure networks, and establishing regulations and partnerships to reduce the cost and increase the deployment rate of EV Chargers
- ➔ The BC Government is clearly moving swiftly on ZEV mandate, however:
  - there is no support for planning local EV charging infrastructure
  - EV charging infrastructure costs are currently too high and require a more coordinated approach and potentially regulatory intervention to bring down the cost
  - there is inadequate guidance or regulations re: charging infrastructure in new and existing buildings





## CO-BENEFITS

- ➔ Promoting a higher uptake in EV creates significant GHG reductions while not impacting lifestyle.
- ➔ Electric vehicles will deliver substantial savings to owners with regards to operations.
- ➔ Because EVs cost significantly less to operate and maintain relative than ICE vehicles and vehicles costs are dropping, there will be significant personal savings as well a significant local economic development benefits with a share of avoided spending on fuel on local goods and services
- ➔ Increased electric vehicles will improve local air quality.
- ➔ Electric bike infrastructure will also increase uptake of cycling in the City.

DESCRIPTION

Zero emission buses can make significant contributions to cutting carbon, local air pollution, and the long-term operational costs of transit buses.

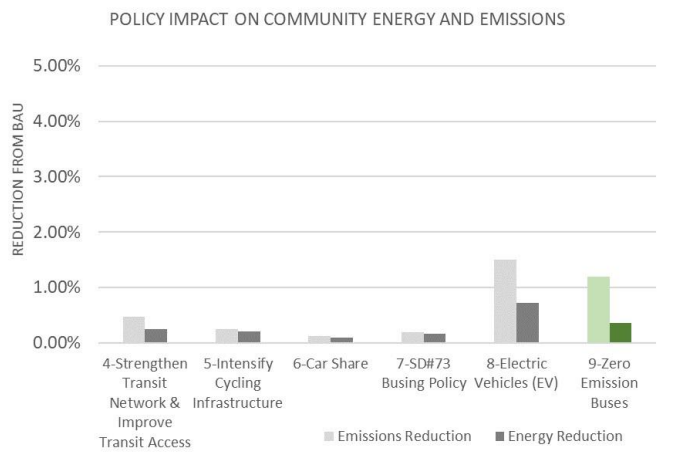
This strategic opportunity will involve the replacement of diesel buses with battery electric buses. This opportunity will be driven by BC Transit, yet to be successful it will require strong partnerships, notably with local governments and electric utilities. Longer highway and rural routes may be too costly to electrify and may be fueled by Renewable Natural Gas CNG buses. The City of Kamloops may be in a position to generate the RNG for Kamloops’ BC Transit service from organic waste feedstocks.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 47,500 GJ (0.40% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction of 6 7,700 tCO2e (1.40% reduction from the BAU)



CO-BENEFITS

- ➔ Bus electrification is typically displacing diesel engines, contributing significantly to cutting air pollution

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
• Currently no action.	• 40% electric and 40% RNG by 2025, and 20% diesel at 2024
	• 95% electric buses and 5% RNG by 2039

ACTORS AND ACTIONS

- ➔ BC Transit
- ➔ City planning and engineering departments to coordinate, plan and deploy on-route charging infrastructure
- ➔ Potentially City waste management and utility services – if RNG was to be generated from City landfill, organics and biosolids
- ➔ Other large players, e.g. TRU, the Chamber, etc

IMPLEMENTATION CONSIDERATIONS

- ➔ While this will predominantly be driven by BC Transit, the City can play an important supportive role by allocating space for charging infrastructure on city land or facilitating its integration into private sector developments.
- ➔ Despite higher upfront costs, electric buses cost less to operate and maintain than diesel, and battery prices are dropping. Over the long-term bus electrification will become cost saving strategy.
- ➔ Most zero emission buses will be battery electric and this is what BC Transit has committed to. Renewable natural gas CNG buses, however, may be part of the mix because long highway and rural bus routes can be very costly to provide battery electricity bus service. The City may be in a position to generate the RNG for Kamloops’ BC Transit service from organic waste feedstocks.
- ➔ Should BC Transit consider replacing diesel busses with CNG, then local production and purchase of RNG will become a consideration

NOTES

- ➔ A solid framework for decarbonizing transit can put other heavy duty vehicle operators on track to decarbonize their vehicles, starting logically with school buses and then moving onto commercial buses.
- ➔ Assumption to be confirmed with BC transit assumed to be 95% zero emissions by 2039.

DESCRIPTION

Emerging strategic opportunities in the forthcoming Downtown Transportation Demand Strategy may be applicable to the Citywide context with increased investment and political support. This strategy therefore explores at a high-level the potential energy and emissions impacts that may result from an expansion and reinforcement of transportation demand strategy action items that are complementary and, in addition to the actions in the proceeding strategies.

ENERGY PROJECTIONS

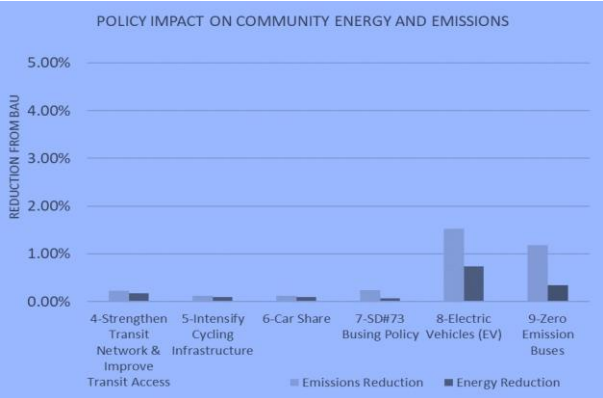
**Business as Usual**  
2039 Community Energy:  
11,500,000 GJ/yr

**Strategic Opportunity**

EMISSIONS PROJECTIONS

**Business as Usual**  
2039 Community Emissions:  
545,000 tCO2e/yr

**Strategic Opportunity**



CO-BENEFITS

➔ TDM co-benefits from TDM strategy to be enumerated here.

PERFORMANCE ASSUMPTIONS FOR 2039

**Business as Usual**

- Currently no action.

**Strategic Opportunity**

TDM choices Actions: S-3, S-4, S-5, S-6, M-2, M-3, M-5 L3

ACTORS AND ACTIONS

- ➔ Downtown TDM Choices Strategy
- ➔ BC Transit
- ➔ Ministry of Transportation and Infrastructure, BC Hydro, FortisBC
- ➔ TRU, major employers

Implementation Considerations

- ➔ S-3: Hire a Full-time Transportation Choices Coordinator.
- ➔ S-4: Offer workplace travel program assistance, including a Transportation Choices toolkit, and engagement opportunities
- ➔ S-5: Develop and rollout a Transportation Choices program for City employees
- ➔ S-6: Allocate a portion of parking revenues to Transportation Choices programs, infrastructure and services
- ➔ M-2: Launch ride-matching service
- ➔ M-3: Revise the parking fee structure for City-owned facilities
- ➔ M-5: Implement a residential travel planning program to targeted neighbourhoods
- ➔ L-3: Further integrate Transportation Choices into development bylaws

Please refer to the following summary with regards to the effects of energy and emissions reductions from Buildings emerging opportunities.

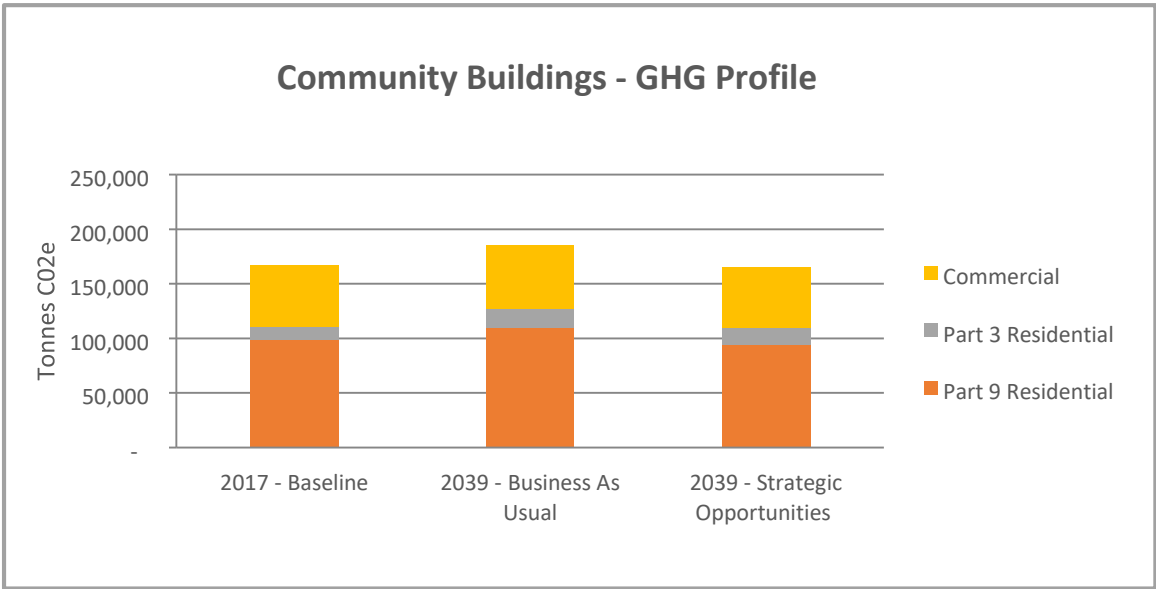


Figure 6 - Buildings Emissions - 2017 - BAU - Strategic Opportunities Comparison

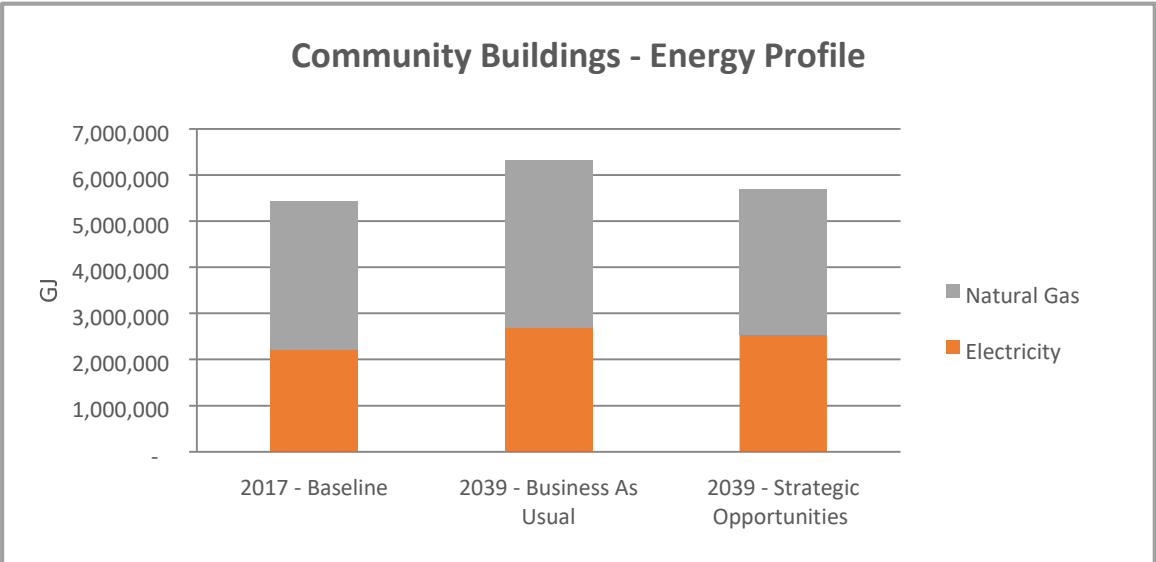


Figure 7 - Buildings Total Energy Usage - 2017 - BAU - Strategic Opportunities Comparison

DESCRIPTION

The Province has committed to taking steps to increase energy-efficiency requirements in the BC Building Code to make buildings net-zero energy ready by 2032. The Step Code outlines a schedule of minimum requirements, but local governments can adopt these minimum steps in advance of the provincial schedule.

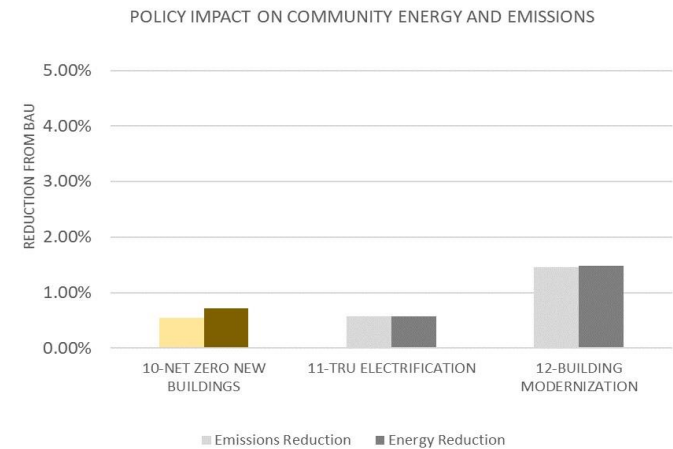
This strategic opportunity would move Kamloops to higher steps of the Code at an accelerated pace. This augmented implementation process would enable higher performance through an acceleration of the market transformation process.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 80,580 GJ (0.71% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 2,970 tCO2e (0.54% reduction from BAU)



NOTES

Experiences from other communities requiring higher steps (as of 2019) for both part 3 and 9 buildings may inform decision making processes for the City.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
• Process has begun.	• Two years ahead of provincial schedule for first step, then on a three-year cycle rather than provincial five-year cycle.

ACTORS AND ACTIONS

- ➔ KAMPLAN
- ➔ Development community, Local builders, TRU, Forest products sector and pre-fabricated building manufacturers
- ➔ BC Hydro

IMPLEMENTATION CONSIDERATIONS

- ➔ Workshops for builders and developers, awards/recognition and media for builders meeting higher steps can be integrated into a strategy.
- ➔ The City could support a mid-construction blower door test. There are useful precedents by other municipalities to inform a made-in-Kamloops approach.
- ➔ This strategy, too, may benefit from collaboration with TRU for capacity building. There is likely external support to help program development and delivery.
- ➔ Capacity building/incentives on heat pumps.
- ➔ Implementation could be potentially incentivised through modest contributions from the City through rebates tied to energy performance testing.

CO-BENEFITS

- ➔ Well insulated homes and buildings with good passive design elements like awnings and cross ventilation will perform much better in hotter summers.
- ➔ Higher performance buildings and homes can save owners significant operation and maintenance costs, rapidly offsetting any upfront price premiums.
- ➔ As a community with a strong forest products history and many pre-fabricated building companies, Kamloops is well positioned to take advantage of this economic development opportunity
- ➔ Increased efficiency and improved construction standards will lead to improved comfort, air quality, and longevity of buildings.
- ➔ Although the step code is based on energy consumption, higher steps will lead to a greater reduction in fossil fuels and greenhouse gases through increased electrification of buildings due to the higher efficiency of heat pumps vs traditional heating sources.

DESCRIPTION

Thompson Rivers University (TRU) is pursuing an aggressive carbon reduction program for their buildings.

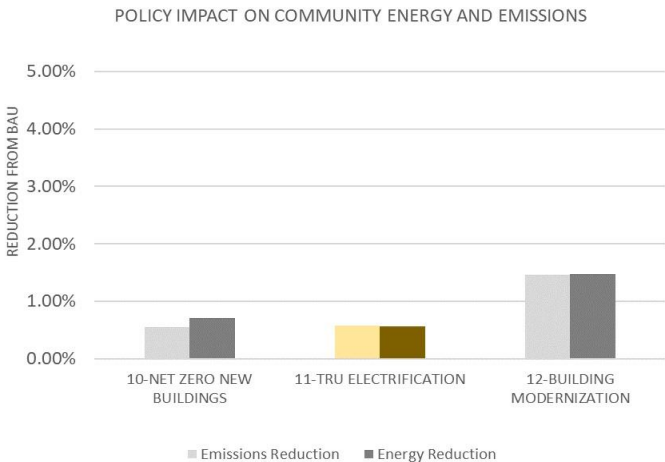
TRU’s building opportunity is focused on three primary areas – electrification, biomass, and solar photovoltaics (PV). TRU expects to have most buildings converted to low carbon heat within 10 years and a total of 3MW of PV installed. All new buildings are expected to use electric heat (typically heat pumps with some electric boilers) and adjacent existing buildings will be converted at the same time. A small biomass plant serving a cluster of buildings may be considered in the future. PV panels will be installed on both new and existing buildings, and potentially some parking areas.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 64,250 GJ (0.57% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO2e/yr	Reduction: 3,120 tCO2e (0.57% reduction from BAU)



CO-BENEFITS

- ➔ Capacity building
- ➔ Training opportunities for students, trades, technicians and professionals

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
• New and existing buildings use typical heating systems, primarily natural gas.	• All new buildings will be clean energy, primarily heat pumps. Existing buildings will be converted to clean energy, primarily heat pumps, by 2030.

ACTORS AND ACTIONS

- ➔ TRU Sustainability Plan
- ➔ TRU Board, administration, and facilities staff.
- ➔ Local building designers – architects, engineers
- ➔ Local plumbing and heating trades

IMPLEMENTATION CONSIDERATIONS

- ➔ TRU’s transition can create a learning platform for local builders, developers and trades installing zero carbon heating systems.
- ➔ Electrification could incur higher charges with demand peaks. TRU is investigating electric storage with BC Hydro.
- ➔ Capital and fuel costs differ across different electric and gas heating systems, along with performance. Performance differences should be integrated into planning.
- ➔ RNG will be procured to fill the 100% renewable gap.
- ➔ Rooftop solar and solar hot water may be strategically feasible.
- ➔ Explore partnership opportunities to decarbonize the Tournament Capital Center

NOTES

- ➔ While, TRU is attempting to become a completely carbon neutral campus certain TRU-related buildings proximal to campus such as “the Reach” were not considered to be carbon neutral by 2039.

DESCRIPTION

Greenhouse gas emissions in B.C. buildings are overwhelming from combustion of natural gas for space and water heating, and modestly from cooking. By mid-century, the vast majority of GHGs in the building sector will be from buildings standing today. Single detached homes are the largest sub-sector of building GHGs. Cutting GHGs in existing buildings involves increasing efficiency and switching to zero carbon heating systems.

The Province has indicated that both retrofits and heat pumps will be an important part of their climate strategy and incentives have rolled out for both and are likely to be expanded. However, provincial incentives are not enough to drive significant change. The City can leverage provincial action through a combination of marketing, awareness raising, contractor training, and targeted incentives.

This strategic opportunity has two components: 1) raising a one-time small levy on all homeowners and businesses, leveraging utility and senior government funding, trebling it, and providing a guaranteed return on investment retrofit for every building owner in Kamloops, along with a long-term capital upgrade plan, plus the periodic deeper retrofit. The program would have an opt-out clause.

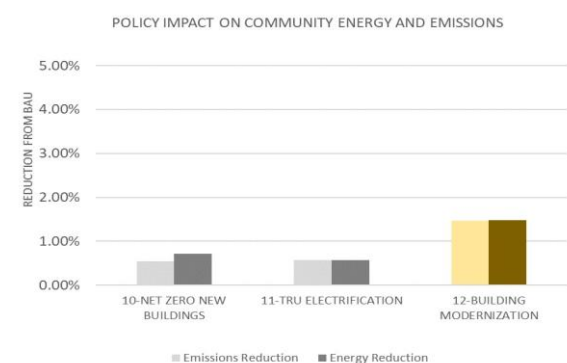
2) Integrate energy retrofits into the building permitting process, leveraging commensurate energy retrofits in all medium to large renovations by cutting permitting costs as a reward and increasing permitting fees as a disincentive, and actively integrating senior government and utility incentives.

ENERGY PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Energy: 11,500,000 GJ/yr	Reduction: 166,840 GJ (1.48% reduction from BAU)

EMISSIONS PROJECTIONS

Business as Usual	Strategic Opportunity
2039 Community Emissions: 545,000 tCO <sub>2</sub> e/yr	Reduction: 7,970 tCO <sub>2</sub> e (1.46% reduction from BAU)



PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>No current municipal policy.</li></ul>	<ul style="list-style-type: none"><li>2% of Part 9 buildings undertake a basic retrofit each year. 10% of those (0.2%) undertake a deeper retrofit with greater savings. One quarter (0.5%) include a heat pump</li></ul>

ACTORS AND ACTIONS

- ➔ Local builders
- ➔ Local suppliers and contractors.
- ➔ TRU or other trades training organizations.

IMPLEMENTATION CONSIDERATIONS

- ➔ The success of a program will largely be influenced by dovetailing local programs with programs delivered by utilities and senior governments, including strategically stacking scarce local CARIP revenue on top of senior government and utility conservation spending.
- ➔ The total square footage of Part 9 homes makes this a very important and most likely priority market for initial program roll out.
- ➔ Part 3 buildings comprise a smaller share of overall GHGs. Their complexity, too, make them more challenging and worthy to add to long-term policies as senior governments and utilities strengthen dedicated programs.
- ➔ City can also use CARIP monies to promote permitting.
- ➔ Fiscal tools, including incentives, can be used along with other policy tools, as well as active promotion of senior government and utility programs.

CO-BENEFITS

- ➔ Improved air quality and comfort in homes.
- ➔ Increasing employment in the building sector or maintaining employment during a potential slowdown in new construction.
- ➔ Energy efficient homes are more resilient to climate change impacts.

NOTES

Driving deep GHG reductions in buildings will require new approaches by senior governments. This must involve innovative financial instruments to capitalize and payback retrofits such as on bill financing, as well as capacity building efforts. Senior governments should take into account the unique relationship that municipalities have with residents and businesses, builders and trades people, and the leverage point of building permit offices. To achieve deep GHG reductions, the City should be prepared to advance opportunities with senior governments.

Please refer to the following summary with regards to the effects of emissions reductions from Solid Waste emerging opportunities.



Figure 8 - Solid Waste Emissions and Collected Waste - 2017 - BAU - Strategic Opportunities Comparison



DESCRIPTION

Emissions from solid waste are the result of organic waste decomposing in landfills anaerobically (without oxygen). Eliminating GHGs from the waste sector involves diverting organics – mostly food, yard and wood waste –from landfills to higher order management strategies. The best strategies extract value from these materials and then recycle what can’t be re-used. CleanBC laid out a 95% waste diversion by 2030 target and the Province is examining how to implement this.

- This strategic opportunity explores two options:
- A) Phased in organics bans in landfills, with programs to divert wood and yard waste, increase paper recycling and introduce curbside food waste pick up for centralized composting.
  - OR
  - B) All of A with the addition of anaerobic digestion of food waste (potentially co-digested with sewage biosolids) to generate biomethane which can be used in the City’s waste hauling fleet as well as other CNG vehicles, potentially also a share of BC Transit’s or the School District’s on highway and rural routes.

EFFECT ON ENERGY

Business as Usual

Strategic Opportunity

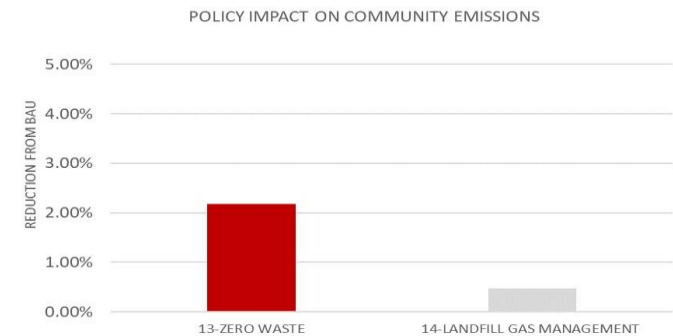
EFFECT ON EMISSIONS

Business as Usual

Strategic Opportunity

2039 Community Emissions: 545,000 tCO2e/yr

Reduction: 11,895 tCO2e (2.18% reduction from BAU)



CO-BENEFITS

- ➔ More sustainable waste management strategy
- ➔ Extended landfill life
- ➔ RNG pathway:
  - Improved air quality
  - Renewable energy innovator with local jobs and revenue

PERFORMANCE ASSUMPTIONS FOR 2039

- Business as Usual
- Strategic Opportunity
- No further action for BAU calculation purposes
  - 50% reduction in paper, yard waste and wood waste by 2022, 75% by 2027, 90% by 2032. 40% reduction in food waste by 2022, 70% by 2027, 90% by 2032.

ACTORS AND ACTIONS

- ➔ TNRD Solid Waste Management Plan
- ➔ Biosolids Management Plan
- ➔ Fortis

IMPLEMENTATION CONSIDERATIONS

- ➔ Education and enforcement significantly increase diversion rates
- ➔ The RNG business case may require additional incentives, e.g. pipeline interconnection guarantee. As well as tipping fees, the City would have several income streams for RNG, e.g. commodity sales, carbon credits, and potentially low carbon fuel standard credits.
- ➔ Any RNG feasibility analysis should evaluate potential local feedstock inputs. The use of biosolids from the sewage treatment centre may be an additional feedstock, however, it may alter prospective compost markets.
- ➔ Renewable natural gas fueled CNG buses can be more cost effective than battery electric on highway and rural routes. BC Transit may be interested in local RNG.
- ➔ South Korea has the global best practice in organics diversion – 2% of residuals are food waste relative to 40% in a typical BC community. It is unlikely provincial and local governments are willing to adopt equivalently strong incentives, regulations, enforcements and other policies. For this reason, a 2039 organic diversion target of 90% was proposed, falling short of B.C.’s 95% diversion target.
- ➔ Effective odour management strategies are essential for centralized composting of food waste. While costly, anaerobic digestion systems effectively manage odour and generate superior compost.
- ➔ There are high-value re-use applications for clean wood and potentially renewable feedstock applications by early to mid 2020s for lower grade wood in gasification systems to generate RNG or other fuels.

DESCRIPTION

Landfill gas (LFG) is about 60% methane. It is generated from organic waste decomposing anaerobically (in the absence of oxygen). Provincial regulation calls for 75% capture from large landfills like Mission Flats. Currently, about 11% of landfill gas is collected and flared/combusted. Combusting methane destroys a highly potent GHG – methane – and releases a less potent, pervasive GHG – carbon dioxide. Landfill gas has the potential to be upgraded to 95% methane, becoming renewable natural gas (RNG) to fuel the City’s own heavy-duty vehicles, displacing fossil methane, and creating a virtuous circular economy.

- This strategic opportunity explores two options.
- A) Expand landfill gas collection systems to newly capped areas and some older areas, and flare this LFG.
  - OR
  - B) Expand landfill gas collection systems to newly capped areas and some older areas, as above; and then upgrade LFG into RNG for use in the City’s heavy duty CNG vehicles, notably its waste hauling trucks.

PERFORMANCE ASSUMPTIONS FOR 2039

Business as Usual	Strategic Opportunity
<ul style="list-style-type: none"><li>No further action for BAU calculation purposes.</li></ul>	<p>A) Increase landfill gas capture and flare rate to 50% by 2025 through to 2039.</p> <p>or</p> <p>B) Increase capture to 15% by 2027, 20% by 2032, and 25% by 2037 and upgrade LFG to renewable natural gas by 2025 for use in the City’s waste hauling trucks, generating x GJ of RNG and displacing y tonnes of GHGs from the City’s waste hauling fleet annually</p>

ACTORS AND ACTIONS

- ➔ TNRD Solid Waste Management Plan
- ➔ FortisBC

IMPLEMENTATION CONSIDERATIONS

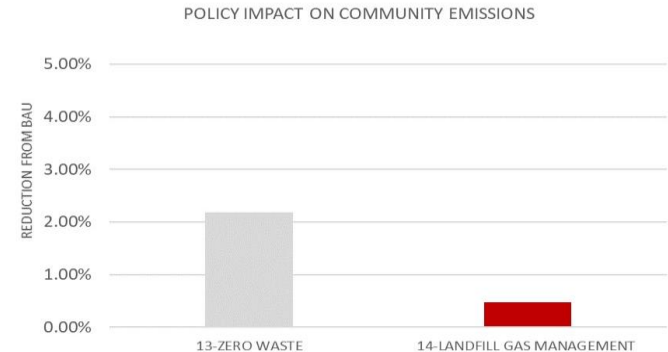
- ➔ Enforcement of provincial regulations may require a higher rate of capture in the future.
- ➔ A rigorous study would be necessary to determine more precisely the volume of methane emitted from Mission Flats, the potential for expanding collection, and the economics of RNG generation.
- ➔ The Columbia Shuswap Regional District is generating RNG from Salmon Arm’s landfill which releases 1101 tonnes of methane annually relative to Mission Flats’ 1,603 tonnes.
- ➔ With higher capture rates there may be opportunities for beneficial use of the collected gas, including using it for heat or injecting it into the Fortis natural gas system.
- ➔ RNG project implementation may require a stronger provincial policy context, e.g. pipeline interconnection guarantee, an additional renewable energy incentive.

EFFECT ON ENERGY

Business as Usual	Strategic Opportunity
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EFFECT ON EMISSIONS

Business as Usual	Strategic Opportunity
Forecast Community Emissions for 2039 are 545,000 tCO2e/yr	Reduction: 2,570 tCO2e (0.47% reduction from BAU)



MULTI CRITERIA ANALYSIS

As a preliminary aid in the evaluation of each strategic opportunity in terms of effect, impact and cost, the following multi-criteria analysis (MCA) has been completed. Multi-criteria analysis is an effort by which multiple criterion are evaluated and scored based on a transparent framework that can be either qualitative (e.g. gross estimates, opinions) or quantitative (e.g. modeled results). The following MCA framework is meant to be flexible and should incorporate content from the City of Kamloops and associated stakeholders, when appropriate. Moreover, the evaluation of certain criteria should be reinterpreted or validated by municipal staff and stakeholders in advance of any substantive decision making. As such, the following should be treated as a starting point only with regards to plan evaluation and it will be refined significantly in the coming phases of the project.

Evaluation Criteria

Based on experience with similar plans in other jurisdictions, the following categories have been proven valuable for MCA-type evaluation. Please refer to the table below which essentially comprises the MCA framework for this assignment:

Criterion	Description	“0” Value	“5” Value	“10” Value
GHG Reductions	The modeled GHG reduction for each Strategic Opportunity against the BAU (Business as Usual) Reference	Marginal GHG Reduction	2.5% GHG Reduction	5% GHG Reduction
Ease of Implementation	The relative complexity for each strategic opportunity to be implemented in the short-term time horizon of 0 to 5 years	Highly complex, multiple stakeholders, significant possibility of community opposition, few precedents, funding concerns	Moderately complex, 2-3 community stakeholder groups, lower possibility of community opposition, some regional precedents, potential funding streams available	Lowered complexity, few significantly affected stakeholders, guaranteed community acceptance, local implementation precedents, funding secured or easily securable
Municipal Authority	% of potential actions resulting from the Strategic Opportunity that are within Kamloops' Sphere of Influence	All resulting actions are under the authority of external stakeholders and/or regional or senior levels of government	Approximately 50% of resulting actions can be executed by the City of Kamloops	All of resulting actions can be executed by the City of Kamloops (by Kamloops, for Kamloops)
Residential and Stakeholder Savings	Qualitative estimation of yearly savings that residents or community stakeholders can appreciate as a result of implementation	Opportunity will result in increase to yearly costs either through increased taxation or direct annualized costs due to required upgrades or associated actions	Opportunity will result in moderate yearly savings for some residents and/or stakeholders (estimated to be in the \$0-\$100 per year per household)	Opportunity will result in considerable yearly savings for most resident and/or stakeholders and (estimated to be greater than \$100 per household)
Municipal Cost	The degree by which program implementation may result in additional costs for the City either through granting programs, rebates, staff training or hiring	Program will incur significant costs, or risk of costs, for the City (exact scale to be determined by municipal staff)	Program will incur moderate costs for the City (exact scale to be determined by municipal staff)	Program will result in net reductions in costs as a result of implementation (exact scale to be determined by municipal staff)
Co-benefits	The short-term quantity and effect of positive outcomes beyond GHG Reductions that may result from opportunity implementation	There are no additional positive effects resulting from this opportunity	There are 2 or 3 noticeable co-benefits resulting from this opportunity	There are demonstrable co-benefits resulting from this opportunity affecting 5 or more areas or showing a substantial impact.

Using the above framework, please refer to the following evaluation which summarizes a basic evaluation of each strategic opportunity. (an Asterix “\*” denotes additional City of Kamloops feedback is desired).

Strategic Opportunity		Evaluation	Score
1-SMART LAND USE	GHG Reduction	This strategic opportunity has the largest impact with regards to emissions at 5.27%.	10
	Ease of Implementation	Altering land use is an onerous process which requires significant levels of community input and analysis. The local building community will also require significant input into this opportunity.	2
	Municipal Authority	Most land use decisions within the City are the purview of the City of Kamloops; however, attempts to alter urban form through regulation are moderated by market forces which are outside of the City's control.	8
	Residential and Stakeholder Savings	Compact land use types guarantee that residents will drive less and use transit and active modes more often, as such yearly transportation costs will be reduced.	7
	Municipal Cost	If urban expansion is theoretically delayed, then infrastructure costs related to greenfield development will be reduced. This will, of course, be mitigated by the loss of DCC revenue in these areas. *	6
	Co-benefits	Health benefits, lower civic infrastructure costs, lower fire interface risk, reduced congestion, strengthens business case for car share and transit.	10
	Basic MCA		7.2

Strategic Opportunity		Evaluation	Score
2-HIDDEN HOUSING SOLUTIONS	GHG Reduction	Marginal at 0.08% from the BAU.	0
	Ease of Implementation	The recently adopted Residential Suite Compliance Policy should facilitate the uptake of this initiative. Enforcement of this initiative, however will require additional effort through the lifespan of the plan. Additional issues with regards to parking may become apparent as well.	7
	Municipal Authority	The regulation of secondary suites is entirely within the jurisdiction of the City of Kamloops. However, the regulation of the quality and form of the suites is governed through provincial building codes.	8
	Residential and Stakeholder Savings	Residents who choose to build secondary suites in their homes will have access to additional revenue from their rental units. This increase in affordability can be substantial in many cases.	8
	Municipal Cost	Regulation and inspection of secondary suites will incur a moderate overhead with the City in terms of bylaw officers and development approvals. *	5
	Co-benefits	Creates housing options for changing family needs. Increases affordability of ownership with revenue stream. Reduces need for greenfield development. Increases efficiencies of existing civic infrastructure. Increases efficiencies in energy use for buildings.	8
	Basic MCA		6.0

Strategic Opportunity		Evaluation	Score
3-GENTLE INTENSIFICATION	GHG Reduction	GHG Reduction of 0.64%, which is low.	1
	Ease of Implementation	This will be a reasonably challenging opportunity to implement as there are outstanding questions with regards to the building community as well as market appetite for “plex”-style buildings. Additional considerations from the BC building code need to be addressed in advance of any significant program implementation.	3
	Municipal Authority	The regulation of plex-style buildings is entirely within the jurisdiction of the City of Kamloops. However, the regulation of the quality and form of the units is governed through provincial building codes.	8
	Residential and Stakeholder Savings	The creation of affordable housing stock for home ownership and/or rental will be significant with this policy.	8
	Municipal Cost	Regulation and enforcement of this program will prove to be an additional cost to the City. However increased development fees can make this program revenue neutral. *	4
	Co-benefits	Improves business case for transit and cycling. Adds to vibrancy in neighbourhoods. Increases rental availability and thus housing affordability. Creates potential revenue stream for homeowners. Provide housing choice (e.g. extended families). Untapped area for affordability/climate action synergies to retrofit/lease/manage secondary suites on behalf of seniors confronting social isolation.	9
	Basic MCA		5.5

Strategic Opportunity		Evaluation	Score
4-TRANSIT NETWORK TUNE UP	GHG Reduction	GHG Reduction of 0.56% which is low	1
	Ease of Implementation	Yearly funding for transit network increases are not guaranteed. Land use forecasting is also imprecise and, as a result, service improvement may not result in transit additional usage.	6
	Municipal Authority	Funding and implementation for the municipal transit network is within the jurisdiction of the City of Kamloops; however, as BC transit is the operator of the fleet there is significant interplay between Kamloops and this stakeholder, which should be considered.	8
	Residential and Stakeholder Savings	Moderate savings will be accrued from the residents switching to transit. Total savings per household has been estimated at \$30 per year.	2
	Municipal Cost	Yearly cost for transit improvements will be determined through annual TFAP process. *	5
	Co-benefits	Reduced congestion, improved transit cost effectiveness, encourages active transport, encourages car sharing.	6
	Basic MCA		4.7

Strategic Opportunity		Evaluation	Score
5-CYCLING INFRASTRUCTURE	<b>GHG Reduction</b>	0.25% reduction in emissions from the BAU	0
	<b>Ease of Implementation</b>	Investment in cycling infrastructure is noted to a be a strategic priority and efforts are underway to accelerate implementation of new facilities. It should, however be noted that due to limited right of way in corridors throughout the city, the construction of separated bike infrastructure may require the loss of other existing facilities, and may as a result incur community opposition	7
	<b>Municipal Authority</b>	While the implementation of new infrastructure is executed by the City, funding for new facilities is dependant on senior government funds.	8
	<b>Residential and Stakeholder Savings</b>	Savings for residents will be accrued through switching modes from automobile to cycling which is substantively less expensive. Total savings per household has been estimated at \$10 per year	2
	<b>Municipal Cost</b>	Program cost is expected to be in line with currently committed costs *	4
	<b>Co-benefits</b>	The health and well-being benefits of increased cycling activity are significant and well documented	6
	<b>Basic MCA</b>		4.5

Strategic Opportunity		Evaluation	Score
6-CAR SHARE	<b>GHG Reduction</b>	0.33% reduction in emissions from the BAU.	0
	<b>Ease of Implementation</b>	Car share implementation has been proven effective in nearby jurisdictions. There a few controversial aspects of this opportunity.	9
	<b>Municipal Authority</b>	Kamloops should regulate car share but will not operate the service.	8
	<b>Residential and Stakeholder Savings</b>	Total savings per household has been estimated at \$10 per year.	2
	<b>Municipal Cost</b>	The cost for Kamloops to operate and/or subsidize a car-share service will be extremely modest. There may be some loss of parking revenue due to preferential parking for car-share vehicles. *	9
	<b>Co-benefits</b>	Improves use of other modes of transportation (i.e. increased walking, cycling, transit).	6
	<b>Basic MCA</b>		5.7

Strategic Opportunity		Evaluation	Score
7-EXPANDED SCHOOL BUS SERVICE	GHG Reduction	0.20% reduction from BAU.	1
	Ease of Implementation	It will take significant amounts of engagement to create buy-in from the SD to support this opportunity in full.	2
	Municipal Authority	School bus policy is outside the City's jurisdictions, but the benefits to reduced GHGs and traffic congestion might make this policy worth pursuing by SD73 with City support.	2
	Residential and Stakeholder Savings	Total savings per household has been estimated at \$10 per year, this will be offset by the increased cost borne by the SD.	2
	Municipal Cost	There is no municipal cost for this opportunity, save what may be passed down by the SD.	7
	Co-benefits	Reduced congestion and emissions, especially in school zones. Health impacts from walking school bus-type activities are well documented and would be appropriate for the Kamloops context.	3
	Basic MCA		2.8

Strategic Opportunity		Evaluation	Score
8-ELECTRIC VEHICLES (EVS)	GHG Reduction	More significant at 1.5% from the BAU (most savings in GHGs are already incorporated into the BAU forecast).	3
	Ease of Implementation	EV policy is currently supported by the provincial government and local planning will soon be underway. As such, it is expected that this opportunity will be well planned and funded.	8
	Municipal Authority	Incentivising EV purchase and usage is within the jurisdiction of Kamloops; however, market forces and provincial and federal subsidies will figure heavily into program success.	3
	Residential and Stakeholder Savings	Savings from EV uptake will be significant especially as the price of fuel continues to rise.	5
	Municipal Cost	The cost to the City for this program will generally lie within operating budgets and not require significant capital expenditures over the lifespan of the plan.	6
	Co-benefits	Increased electric vehicles will improve local air quality. Electric bike infrastructure will also increase uptake of cycling in the City.	5
	Basic MCA		5.0

Strategic Opportunity		Evaluation	Score
9-ZERO EMISSIONS BUSSES	GHG Reduction	More significant at 1.4% from the BAU.	3
	Ease of Implementation	This strategy is already in process and is being pushed by BC Transit, there are few known barriers to implementation.	9
	Municipal Authority	Capital costs for transit fleet is borne by BC Transit and, as such, is largely outside of the City's authority.	0
	Residential and Stakeholder Savings	There are no known positive or negative cost impacts to residents.	1
	Municipal Cost	There are no known costs to the City; however, there are also no known revenue increases as well.	8
	Co-benefits	Bus electrification is typically displacing diesel engines, contributing significantly to cutting air pollution for transit travel.	2
	Basic MCA		3.8



Strategic Opportunity		Evaluation	Score
11-MOVING TO NET ZERO NEW BUILDINGS	GHG Reduction	Low at 0.54% reduction from the BAU.	1
	Ease of Implementation	Challenging; this will be a complex program to administer, monitor and incentivise. The effect of City actions will also need to be moderated by buy-in from the building community.	5
	Municipal Authority	Incentivising and pushing for greater energy efficiency in new buildings is well within the municipality's authority. Existing step-code legislation has already been accounted for in the BAU.	10
	Residential and Stakeholder Savings	Higher performance buildings and homes can save owners significant operation and maintenance costs, rapidly offsetting any upfront price premiums.	6
	Municipal Cost	While not costed out at this time, the cost for incentivization is expected to be significant for this program*.	2
	Co-benefits	New dwellings built to higher energy performance standards will perform much better during hot summers. Increased efficiency and improved construction standards will lead to improved comfort, air quality, and longevity of buildings.	4
	Basic MCA		4.7

Strategic Opportunity		Evaluation	Score
12-TRU CARBON NEUTRALITY	GHG Reduction	Low at 0.57% reduction from the BAU.	1
	Ease of Implementation	As the main task required of the City is to support and ease the process being executed by TRU, implementation should be fairly straightforward.	9
	Municipal Authority	The scope for the City of Kamloops for this opportunity will be limited mainly to supporting and permitting*.	9
	Residential and Stakeholder Savings	There should be no savings for Kamloops residents, and indeed facility upgrades may incur a cost for students (this should be verified with TRU).	7
	Municipal Cost	There are no significant costs associated with this opportunity.	8
	Co-benefits	Capacity building, and training opportunities for students, trades, technicians and professionals.	2
	Basic MCA		6.0

Strategic Opportunity		Evaluation	Score
13-BUILDING MODERNIZATION	GHG Reduction	More significant at 1.5% from the BAU.	3
	Ease of Implementation	Challenging; this will be a complex program to administer, monitor and regulate. The effect of City actions will also need to be moderated by buy-in from the building community, as well as changes to the BC building code*.	2
	Municipal Authority	Market forces, provincial building codes, and the development industry will moderate municipal influence with regards to this opportunity.	2
	Residential and Stakeholder Savings	Higher performance buildings and homes can save owners significant operation and maintenance costs, offsetting any upfront price premiums; however, the capital costs for building modernization are still quite high and have very long return periods.	5
	Municipal Cost	If the City is considering incentivising renewals, this will result in a significant cost*. Program administration and regulation will require the addition of new FTE as appropriate*.	2
	Co-benefits	Improved air quality and comfort in homes. Increasing employment in the building sector or maintaining employment during a potential slowdown in new construction. Energy efficient homes are more resilient to climate change impacts.	3
	Basic MCA		2.8

Strategic Opportunity		Evaluation	Score
14-ZERO WASTE	GHG Reduction	Moderately large at 2.18% reduction from BAU.	4
	Ease of Implementation	Program admiration and compliance will prove challenging; however, there are numerous local and regional precedents with regards to organic waste diversion efforts.	6
	Municipal Authority	This program is entirely within the jurisdiction of the City*.	10
	Residential and Stakeholder Savings	There should be no impact, positive or negative to residents as a result of this program.	2
	Municipal Cost	Municipal costs for this program should be in line with the experience of other municipalities (i.e. xx FTE)*.	6
	Co-benefits	More sustainable waste management strategy and extended landfill life. If the RNG pathway is selected, then improved air quality and renewable energy revenue may offset program costs.	4
	Basic MCA		5.3

Strategic Opportunity		Evaluation	Score
15-LANDFILL GAS MANAGEMENT	GHG Reduction	Low at 0.47% reduction in emission from BAU.	1
	Ease of Implementation	This is a non-controversial program that should be fairly reasonable to implement.	9
	Municipal Authority	RNG project implementation may require a stronger provincial policy context, e.g. pipeline interconnection guarantee, an additional renewable energy incentive. However, actions pertaining to methane capture are entirely within the authority of the City*.	8
	Residential and Stakeholder Savings	There should be no impact, positive or negative to residents as a result of this program.	2
	Municipal Cost	Municipal costs for this program should be in line with the experience of other municipalities and only require an initial capital expenditure.	5
	Co-benefits	With higher capture rates there may be opportunities for beneficial use of the collected gas, including repurposing for heat or injecting it into the Fortis natural gas system.	2
	Basic MCA		4.5

## MULTI CRITERIA ANALYSIS SUMMARY

The following table is presented as a summary of the initial multi criteria analysis. This table will be updated as the project progresses through subsequent phases.

## MULTI CRITERIA ANALYSIS SUMMARY

STRATEGIC OPPORTUNITY	GHG Reduction	Ease of Implementation	Municipal Authority	Residential and Stakeholder Savings	Municipal Cost	Co-Benefits	Basic MCA
1-SMART LAND USE	10	2	8	7	6	10	7.2
2-HIDDEN HOUSING SOLUTIONS	0	7	8	8	5	8	6
3-GENTLE INTENSIFICATION	1	3	8	8	4	9	5.5
4-TRANSIT NETWORK TUNE UP	1	6	8	2	5	6	4.7
5-CYCLING INFRASTRUCTURE	0	7	8	2	4	6	4.5
6-CAR SHARE	0	9	8	2	9	6	5.7
7-EXPANDED SCHOOL BUS SERVICE	1	2	2	2	7	3	2.8
8-ELECTRIC VEHICLES (EVS)	3	8	3	5	6	5	5
9-ZERO EMISSIONS BUSES	3	9	0	1	8	2	3.8
11-MOVING TO NET ZERO NEW BUILDINGS	1	5	10	6	2	4	4.7
12-TRU ELECTRIFICATION	1	9	9	7	8	2	6
13-BUILDING MODERNIZATION	3	2	2	5	2	3	2.8
14-ZERO WASTE	4	6	10	2	6	4	5.3
15-LANDFILL GAS MANAGEMENT	1	9	8	2	5	2	4.5

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# CONCLUSION

To be competed.