Central Okanagan

CLEAN AIR STRATEGY

2015

City of Kelowna

Lake Country
Life. The Okanagan Way.

Peachland
On the Lake

RDCO
Regional District of Central Okanagan

District of West Kelowna

Westbank First Nation

Acknowledgements

This Strategy is the outcome of a collaborative process involving Regional District Directors, the public, RDCO and local government staff, and an active group of air quality experts who all volunteered their time to provide advice and assistance in shaping this document.

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Summary

This 2015 Central Okanagan Clean Air Strategy is a collaborative effort between: the City of Kelowna, the Districts of Lake Country, Peachland and West Kelowna, Westbank First Nation, and the Regional District of the Central Okanagan. The Strategy defines an updated Clean Air Vision and Goals, and outlines a set of strategies and actions to take on over the next 5 years to help the region achieve these. Input was gathered from a multi-stakeholder advisory group, staff members from the regional partners, and from the general public.

Clean Air Vision and Goals

Vision **Clean and healthy air for current and future generations.**

Goals

- → The health of citizens and the environment is protected.
- → Citizens and visitors enjoy clear views of the region's stunning landscape.
- → Regional greenhouse gas emissions are minimized.

This vision and goals will be accomplished by:

- → Citizens, businesses and governments making choices that minimize pollution.
- → Communities designed to make it easy for citizens and businesses to minimize pollution.

Measures This plan will track progress through the following:

- → Levels of fine particulate matter and ground-level ozone remain below the Federal or Provincial air quality objectives and standards.
- → There is continuous improvement in the levels of annually-averaged air pollutants for fine particulate matter and ground-level ozone.
- → Communities are reducing total greenhouse gas emissions.

State of the air in the Central Okanagan

The air quality in the Central Okanagan is generally good, as measured pollutants rarely exceed provincial and national standards. Specific events can cause pollutants to exceed those levels – particularly due to smoke from forest fires. Science studies have yet to

determine a safe level of exposure, below which no adverse health effects occur, for the two pollutants of greatest concern to human health (fine particulate matter and ground-level ozone). Therefore the Central Okanagan needs to strive to continually improve air quality by reducing levels of these pollutants. Over the last decade of air monitoring data from Kelowna, there is no discernable trend (up or down) in the levels of either of these harmful pollutants. Several pollutants are forecast to continue to increase over time.

Climate change (greenhouse gas emissions)

Many of the activities that produce local air pollutants also emit greenhouse gases that are linked with global climate change. Because of these links, it makes sense to manage these pollutants in an integrated way, finding the most effective ways to achieve both healthier air in the Central Okanagan, and reduced impact on global climate change. Each local government is responsible for putting in place targets and actions to reduce community GHGs. This plan complements those targets and actions by highlighting activities that reduce greenhouse gas emissions (GHGs) and also result in reduced local air pollution. Community greenhouse gas emissions in the Central Okanagan continue to increase, and are estimated to grow by 25% by 2020 if no further action is taken. Significant effort will be needed over the next five years and beyond to meet the GHG emission reduction targets set by local governments and reduce the region's impact on climate change.

Clean Air Strategies

Sixteen strategies in five topic areas were identified to help achieve the Clean Air Vision and Goals. For each strategy identified, several specific actions are identified in this plan. In addition to actions to be undertaken by the regional partners, there are numerous areas where senior levels of government, other organizations, businesses and citizens also play a critical role in achieving the clean air vision for the Central Okanagan. The strategies are summarized under the five topic areas in the table on the following page.

Sustainable Transportation	
Walking, cycling, public transit, carpooling and clean vehicles are the most accessible, affordable and efficient ways to get around.	
1	Integrate air quality requirements and targets into transportation and land use plans
2	Develop and deliver programs to encourage sustainable modes of transportation
3	Reduce emissions from vehicles on the road
Green Industry	
Commercial, forestry, agricultural and other industrial operations across the region make decisions that keep our air clean and clear.	
4	Reduce emissions from commercial fleets and diesel equipment
5	Aim to eliminate smoke from burning (agriculture, forestry & land clearing)
6	Manage pollutants from commercial operations
7	Regional coordination with industry
Clean Outdoor Activities	
Community members minimize air pollution from outdoor maintenance and recreation activities.	
8	Aim to eliminate backyard burning in residential neighbourhoods
9	Minimize pollutant emissions from yard maintenance activities
10	Minimize pollutants from recreation activities (ATVs, boats, etc)
Green Buildings	
Buildings are energy efficient, use green energy, and keep our air clean and clear.	
11	Reduce and/or eliminate smoke emissions from home fireplaces and woodstoves
12	Address emissions from household products (e.g. cleaning and painting)
13	Support green building, renovations and renewable energy in homes
Better Information and Awareness	
Community decision makers, businesses and citizens have access to clear, accurate information to help us make the best decisions to keep our air clean and clear.	
14	Improve local air quality data and information
15	Make local air quality information accessible to decision makers
16	Make air information available to all citizens and businesses

Implementation Plan

Effective implementation of this Clean Air Strategy will require dedicated staff resources and funding for disbursements. A high-level estimate of staff resources and disbursements for implementing this plan is provided for planning purposes:

- Staff resources: approximately 1.0 Full-Time Equivalents for 5 years to manage the implementation and undertake many of the actions, and these are estimated to be undertaken by current staffing levels within Regional Services. An additional 0.5 FTE per year is identified to support further active transportation programs.
- Annual budget: the current annual budget of $80,000 is used to fund the Agricultural wood chipping program, and this is recommended to continue.
- Estimated additional funding needed: actions have been identified that go beyond the current funding levels, and high-level estimates for these total up to $75,000 per year over 5 years. These costs may be considered on a year-by-year basis, may be offset by contributions from external agencies or other funding avenues.

Potential sources of funding for specific activities are also identified.

Conclusion

The region has defined a strong clean air vision, goals and ambitious targets. This Strategy identifies a path forward for the regional partners to support these. However, it is clear that significant ongoing action by all levels of government, by businesses and by citizens will be required to keep our air clean and healthy for current and future generations.

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1 Introduction

This Clean Air Strategy was developed for the Central Okanagan region as a regional partnership of the governments in the region. This partnership includes the four municipalities of Kelowna, Lake Country, Peachland and West Kelowna, Westbank First Nation, and the rural areas of the Regional District of Central Okanagan (RDCO) – Electoral Areas West and East.

The Strategy provides guidance for the regional partners, through the Regional Services department, to manage air quality and greenhouse gas emissions in the Central Okanagan for the next five years. This air quality program has been in place for many years, and was previously guided by the Air Quality Management Plan created in 2007 by RDCO, together with its regional partners.

1.1 Scope and objectives of this strategy

This strategy focuses on the ambient air pollutants that have the most significant potential health impacts in this region: fine particulate matter ($PM_{2.5}$) and ozone (0_3). Because there is significant overlap between the sources and mitigation measures for these local air pollutants and greenhouse gas emissions (GHGs) that lead to global climate change, this plan supports actions that have the co-benefit of reducing both GHGs and local air pollution. Each local government in the region is responsible for putting in place targets and actions to reduce community GHGs. This plan complements those targets and actions by highlighting activities that reduce greenhouse gas emissions (GHGs) and also result in reduced local air pollution.

1.2 How this strategy was developed

This strategy was developed in two phases. Phase 1 offered a 5-year review of the Central Okanagan Air Quality Management Plan, and included an analysis of air quality data for the region, identified changes to senior government policy and legislation since the last plan was drafted, summarized achievements made over the last 5 years, and offered insights into best practices to be considered in Phase 2 of this Strategy.

Preliminary results from the Phase 1 report were shared with the project's Advisory Group, comprised of local, provincial, and federal air quality experts. Comments were addressed and the revised Phase 1 report was presented to the Regional Board for approval before moving onto Phase 2.

Phase 2 began with an Advisory Group meeting to offer input into the Vision and Goal topics for this strategy. Based on the comments received from the Advisory Group, goals

were revised and preliminary actions were developed. These were brought back to the Advisory Group in a second workshop for comment. Based on feedback, the draft Goals, Strategies, and Actions were developed and shared with the public through the MindMixer online engagement platform.

Online engagement was open for comment from April 23rd to May 6th 2014. The Communications Department estimates that over 100,000 residents were made aware of this engagement process through printed and on-line media. Residents from all partners were informed through their respective websites and printed media. The media campaign resulted in nearly 900 views between Facebook and MindMixer, over 100 comments, and 61 ideas from the public. Input generated was reviewed and incorporated into this Phase 2 report. The public provided feedback through various means: commenting on the draft strategies, identifying the strategies that were most important to them, and proposing new ideas or suggestions. Overall the public was supportive of the strategies identified. The strategies with the most support included developing active transportation programs, implementing actions to reduce vehicle emissions, and expanding the wood-chipping program to reduce the amount of open burning. The level of support is noted with the strategies in the implementation section of this report.

The following table provides a summary of activities used in this project to engage the public and key stakeholders.

Table 1. Summary of consultation activities during plan development

Audience	Activity	Time	Outcome
Advisory Group	Email review of Phase 1 Report	January 2014	• Input into Phase 1 Report
Regional Board Directors	Regional Services Committee Meetings	Feb 2014 and June 2014	• Informed Regional Board • Approval to continue with the planning process
Advisory Group	Advisory Group Meetings	Feb 2014	• Review and offer feedback on work completed • Offer input on vision and goals
Advisory Group	Advisory Group Meetings	April 2014	• Review and offer feedback on work completed • Offer input on strategies, and actions • Inform implementation plan

Audience	Activity	Time	Outcome
Public	Online Engagement via MindMixer and Facebook	April 23rd to May 6th	• Inform and prioritize strategies and actions
Advisory Group	Email Review of Phase 2 Report	May 2014	• Review and offer feedback on work completed • Offer input on strategies, and actions • Inform implementation plan
Regional Board Directors	Regional Services Committee Meetings	July 2014 to February 2015	• Informed Regional Board • Approval of Clean Air Strategy

1.3 Policy Context

Each level of government has responsibility for a number of areas that can impact the quality of the air in the Central Okanagan. This section highlights the key areas of responsibility for each level of government with respect to air quality and climate change mitigation.

1.3.1 Federal government

Federal areas of responsibility

Establishing vehicle and fuel emission standards; regulating marine vessels, railways, off-road engines.

Key Federal regulations

- Canadian Environmental Protection Act (CEPA).
- *Federal Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations*, under *CEPA*. New vehicles sold in 2016 are expected to be 40% more fuel-efficient than those sold in 2008.
- *Federal Heavy Duty Vehicle and Engine Greenhouse Gas Emission Regulations*. These will improve the efficiency of new heavy-duty vehicles sold in 2018 and beyond.

Current policies and programs

- Nation-wide target to reduce GHG emissions by 17%, relative to 2005 levels, by 2020.
- Air Quality Management System (AQMS), which began implementation in 2012, includes reviewing and updating national pollutant standards, setting limits for industrial emissions, addressing transportation emissions and providing a framework for regional air zone management.[1]
- Updated Canada Ambient Air Quality Standards (CAAQS) for fine particulate matter and ground-level ozone in 2013 to lower allowable levels of pollutants, now matching the recommendations made by the World Health Organization in 2006. Updated CAAQS for nitrogen dioxide and sulphur dioxide are currently in development.

1.3.2 BC Provincial government

Provincial areas of responsibility

Regulating point and area sources of pollution – particularly industry and business; establishing air quality standards and guidelines; requiring air quality management planning where needed.

Key Provincial regulations

- Environmental Management Act (including Open Burning Smoke Control Regulation, 1993 and Solid Fuel Burning Domestic Appliance Regulation, 1994).
- Greenhouse Gas Reduction Targets Act (Bill 44, 2007).
- Local Government (Green Communities) Statutes Amendment Act (Bill 27, 2008).

Current policies and programs

- Province-wide GHG emission reduction target of 33% below 2007 levels by 2020, and 80% by 2050.
- BC Climate Action Plan to support Bill 44 (including introduction of the carbon tax).
- BC Air Action Plan (2009) with 28 actions to reduce pollution.
- New ambient air quality criteria for fine particulate matter (2009).
- Updated BC Building Code to reduce energy and water use in buildings through requirements such as solar hot water-ready homes and energy performance.

[1] See http://www.ccme.ca/ourwork/air.html?category_id=146.

- Currently updating the *Open Burning Smoke Control Regulation* and the *Solid Fuel Burning Domestic Appliance Regulation*, to include measures that reduce emissions from burning.
- BC Scrap-it program that incents removal of old high-emission vehicles from the road.
- Idle Free BC provides resources for communities and organizations to create idle reduction programs and policies.

1.3.3 Local governments in the Central Okanagan

Local government areas of responsibility

Land use, zoning and transportation planning; community sustainability and climate action planning; bylaws to regulate nuisances and disturbances in relation to smoke, dust, fumes etc., enabling bylaws for backyard burning, wood stoves and vehicle idling.

Key local government bylaws

- RDCO Regional Fire Prevention Bylaw No. 1066 now requires a venting index of 65 or greater and a $PM_{2.5}$ concentration of 15 $\mu g/m^3$ or less for outdoor burning (2011)
- RDCO Regional Smoke Control Bylaw No. 773 (created 1998, consolidated 2011)
- Municipal open burning bylaws:
    - City of Kelowna, bylaw 10760
    - District of Lake Country, bylaw 612
    - District of Peachland, bylaw 1718
    - District of West Kelowna, bylaw 0114
- Westbank First Nation Fire Protection Law No. 2005-11
- RDCO Regional Growth Strategy (Final June 2014)
    - Continue efforts to improve air quality by supporting the Regional Air Quality Management Plan.
    - Encourage cooperation with regional partners, provincial ministries and stakeholders on initiatives that improve efforts to reduce GHG emissions, improve energy conservation and mitigate climate change impacts.
    - Work toward meeting the provincial target of reducing GHG emissions by 80% from 2007 levels by 2050.

- Municipal Official Community Plans (OCPs)
    - Each municipality has included policies, targets and actions in relation to air quality and climate in its OCP.
    - GHG reduction targets: each OCP includes a target to reduce GHG emissions from community activities by 33% by 2020 from 2007. Peachland and West Kelowna have also adopted a target to reduce community GHG emissions 80% by 2050 from 2007.
    - Lake Country, Peachland and West Kelowna OCPs each contain statements to support the regional air quality management plan.

Current policies and programs

Regional partners in the Central Okanagan have been implementing the 2007 Air Quality Management Plan for 5 years and have undertaken a number of activities. These are listed within strategy section below.

Related local government plans

Each Central Okanagan local government has developed other plans that have a connection to protecting air quality and reducing impacts on climate change. These include:

- Regional Active Transportation Master Plan, 2012
- Regional Solid Waste Management Plan, 2008
- Transit Future Plan: Central Okanagan Region, 2011
- City of Kelowna Climate Action Plan, 2012
- District of Lake Country Community Energy and Emissions Plan (draft), 2012
- District of Peachland Community Energy and Emissions Plan, 2012
- District of West Kelowna Transportation Master Planning, ongoing

1.3.4 Westbank First Nation

The Westbank First Nation has completed a Comprehensive Community Plan, which includes a section on Sustainability and the Environment. The primary objective of this section is to ensure the Nation acts as stewards of the natural environment and uses resources in a way that "benefits all the people, animals and other living organisms that reside in and around the Okanagan."[2] It is the hope of the Nation that the 2015 Clean Air Strategy will provide specific policies, bylaws, and activities that the Nation can incorporate into their planning documents and practices to ensure the ongoing protection of the air quality in our shared valley.

[2] Westbank First Nation Comprehensive Community Plan.

2 Air pollution in the Central Okanagan

The air quality in the Central Okanagan is generally good, as measured pollutants rarely exceed provincial and national standards. Specific events can cause pollutants to exceed those levels – particularly due to smoke from forest fires. Research indicates that although ambient air quality is meeting standards, specific neighbourhoods may reach unhealthy levels due to woodstoves, and proximity to major roads. This is important when the air is stagnant or there is an inversion. With growth in the region, these pressures will increase unless appropriate measures are taken to mitigate the effects of this growth.

2.1 Major local air pollutants and their potential health impacts

Air pollution has been linked with serious health impacts, including cardiovascular disease and cardiovascular mortality, respiratory disease and lung cancer.[3] Pollution also impacts visual air quality. Air pollutants of greatest concern to human and environmental health in the region are particulate matter and ground level ozone.

Particulate matter (PM) affects the respiratory and cardiovascular systems. PM has been designated as *carcinogenic to humans* by the World Health Organization. [4] Although the national Standard is not exceeded in the Central Okanagan, levels of $PM_{2.5}$ do occasionally measure above that pollution level. For example, during the 2003 forest fire, there were 17 24-hour periods that measured above the national Standard level for $PM_{2.5}$. Black carbon is a component of particulate matter that results from incomplete combustion of fossil fuels and biomass (including yard trimmings, brush, wood). In addition to being harmful to human health, evidence indicates that black carbon may also be a significant short-term contributor to climate change.

Ground Level Ozone (as opposed to the "ozone layer" high in the atmosphere that protects us from ultra-violet radiation) is the main component of smog. Ozone affects the respiratory system causing shortness of breath, coughing, inflammation, and can trigger conditions such as asthma and bronchitis. People with respiratory problems are particularly vulnerable to ozone, and are advised to limit outdoor exercise and exposure when ozone is high. Elevated ozone can also adversely impact plant growth and ecosystem health. Measured levels of ozone are below the national Standards every year in Kelowna, but not by a very large margin. The highest measured levels of ozone, based on available data, were observed on three days in the summer of 2012.

Other local air pollutants of concern in the valley are Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs). These are both major contributor to the formation of ground

[3] WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide; Summary of risk assessment, World Health Organization, 2006.
[4] World Health Organization, Press Release No. 221, 2013 https://www.iarc.fr/news-events/iarc-outdoor-air-pollution-a-leading-environmental-cause-of-cancer-deaths/

level ozone. Additionally, VOCs can cause eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. Certain VOCs are also carcinogenic to humans (e.g. Benzene).

2.2 Major sources of air pollution

The following table outlines the key pollutants and the major sources of these pollutants in the Central Okanagan.

Table 2. Summary of key pollutants and their sources

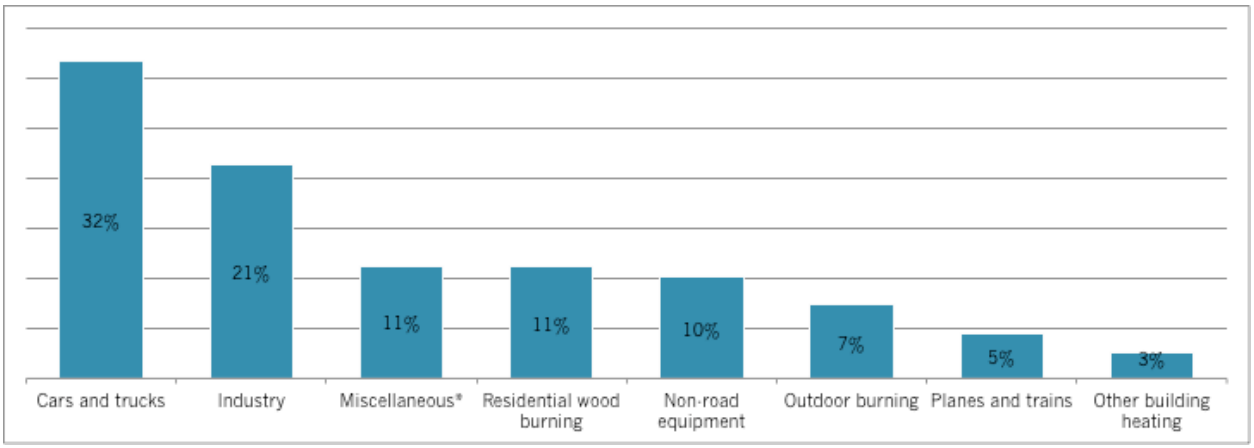
Pollutant	Source
Particulate Matter	• Directly emitted from combustion (e.g. forest fires, woodstoves, vehicle engines) • Formed through chemical reactions (e.g. ammonia, nitrogen oxides, sulphur oxides) • Black carbon results from inefficient burning, including diesel engines and woodstoves
Ozone	• Forms when nitrogen oxides and volatile organic compounds react in sunlight on warm days • Levels of ozone tend to be elevated during midday on hot summer days, as the reaction accelerates above 25 degrees Celsius • Formation can take place over several days and may arise from pollutants released hundreds or thousands of kilometres away
NOx	• Directly emitted from burning fossil fuels at high temperatures • Primary sources are transportation and heating fuels • Contributes to formation of ground-level ozone
VOCs	• Formed though fossil fuel evaporation and combustion, solvent use and industrial processes • Large amounts of VOCs can also be present from natural sources such as vegetation and forests (especially coniferous) • Contributes to formation of ground-level ozone
NH_3	• Primarily emit from agricultural operations (approximately 65%) • Secondary source is heavy-duty diesel vehicles (approximately 20%)
GHGs	• Combustion of fossil fuels in vehicles, and in buildings accounts for over 90% of emissions • Decomposing solid waste emits methane, a powerful GHG

The term smog-forming pollutants refers to the sum of several pollutants: fine particulate matter, nitrogen oxides, sulphur oxides, volatile organic compounds and ammonia which react in the presence of sunlight to form ozone, vapours and particles that cause smog.

Total smog-forming pollutants emitted in 2006 in the Central Okanagan were estimated to be 26,000 tonnes.[5] The following diagram summarizes the primary sources of smog-forming pollution in the Central Okanagan (see Figure 1).

Although this inventory provides a snapshot of where emissions come from inside the airshed, certain pollutants get transported into the airshed from other regions. Pollutants that come from outside the airshed are termed "transboundary" sources, and may play a significant role in the Okanagan airshed.

Figure 1. Sources of smog-forming pollution in the Central Okanagan, 2006



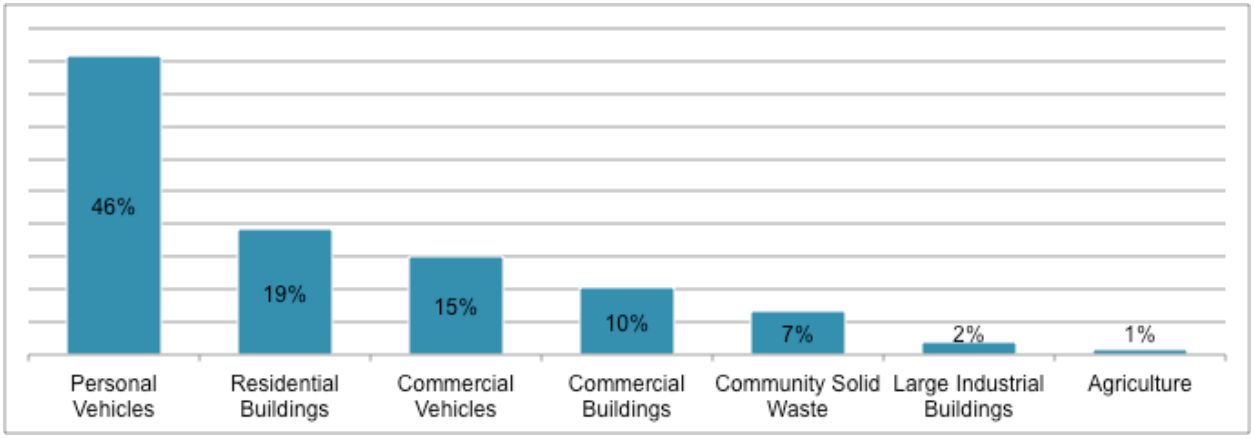
* Miscellaneous sources include solvent use and surface coating activities.

2.3 Links between air quality and climate change

The combustion of fossil fuels (gasoline, diesel, natural gas) is the major source of both smog-forming local air pollution, and of the region's greenhouse gas emissions. Recent evidence also links particulate matter emissions to short-term impacts on climate change. Because of these links, it makes sense to manage these pollutants in an integrated way, finding the most effective ways to achieve both healthier air in the Central Okanagan, as well as reduced impact on global climate change. Total GHGs emitted from community activities in the Central Okanagan in 2010 are estimated to be 1.2 million tonnes.[6] Figure 2 shows the primary sources of greenhouse gas emissions from community activities in the Central Okanagan.

[5] RWDI, Okanagan High Resolution Emissions Inventory for Environment Canada, 2010. This is the most recent air emissions inventory conducted for the Central Okanagan region.
[6] BC Ministry of Environment, Community Energy and Emissions Inventory for Central Okanagan Regional District, 2010 (released February 2014). GHG emissions exclude large industrial processes and electricity use, off-road vehicles, aircraft and rail. https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei

Figure 2. Sources of GHG emissions in the Central Okanagan, 2010[7][8]



2.4 Looking ahead: forecast for Central Okanagan's emissions

To plan for reducing emissions over the long-term, it is helpful to understand what trajectory we are currently on with respect to emissions – are emission rates continuing to increase, or have new technologies become so efficient that emission rates are leveling off or even decreasing? The answer is different, based on the type of pollutant. "Business-as-usual" forecasts estimate the direction of these emission trends, taking into consideration known changes to legislation (for example, the new federal vehicle emission standards) and known improvements to technology. Based on forecasts completed previously for air pollutants[9] and GHG emissions[10], here is a summary of what is expected for various pollutants in the Central Okanagan:

[7] These GHG emissions include only "community activities" – all driving from vehicles registered in the region (personal, commercial); heating and powering buildings in the region (homes, shops, industry, municipally-owned buildings, etc.); all solid waste deposited at the landfills; and livestock activities.

[8] GHG emissions from Large Industrial Buildings are based solely on the amount of natural gas consumed, and do not include GHGs that may result from various industrial processes, or emissions from Large Industrial electricity use (these were withheld). GHG emissions from Agriculture are estimates of the amount of methane released by enteric fermentation and are based on the 2007 inventory report.

[9] RWDI, Okanagan 2030 High Resolution Emissions Inventory, 2011

[10] SSG, GHG Implications of Land-Use Scenarios for the RGS, 2012

Local air pollutants: forecast change 2006 to 2030

- Coarse particulate matter (PM_{10}): increase 18% to 80% (depends on forest fires)
- VOCs: increase 14%
- Ammonia (NH_3): increase 7%
- Fine particulate matter ($PM_{2.5}$): increase 0% to 180% (depends on forest fires)
- NOx: decrease 7%
- SOx: decrease 2%

The projected increases are largely due to expected increases in commercial/industrial activities and open sources (fires), while the projected decreases are due to improved vehicle emission standards that will take effect as older vehicles are replaced by newer ones over time.

Greenhouse gas emissions: forecast change 2007 to 2020

- GHG emissions: increase 25%

The projected increase in GHG emissions closely tracks estimated population growth over that time. Although vehicles are becoming more efficient, more people driving longer distances will result in an increase in emissions.

Based on these forecasts, the challenge is significant. How can the region put in place measures that will support an overall reduction in these pollutants, even as population grows? The rest of this Strategy identifies several opportunities for emission reductions that can be led by the regional partners.

3 Clean Air Vision, Goals and Targets

The Clean Air Strategy is framed by an air quality Vision for our region, and is supported by three overarching goals. Statements to illustrate the role citizens and business will play in protecting and enhancing our air further ground the Vision and Goals of this strategy.

Vision **Clean and healthy air for current and future generations.**

Goals → The health of citizens and the environment is protected.

→ Citizens and visitors enjoy clear views of the region's stunning landscape.

→ Regional greenhouse gas emissions are minimized.

This vision and goals will be accomplished by:

→ Citizens, businesses and governments making choices that minimize pollution.

→ Communities designed to make it easy for citizens and businesses to minimize pollution.

3.1 Measures and Targets

To track progress towards meeting this vision and goals, the region will report on the following measures:

Measures This plan will track progress through the following:

→ Levels of fine particulate matter and ground-level ozone remain below the Federal or Provincial air quality objectives and standards.

→ There is continuous improvement in the levels of annually-averaged air pollutants for fine particulate matter and ground-level ozone.

→ Communities are reducing total greenhouse gas emissions.

In addition to these measures, the RDCO and each municipality in the region have set targets to reduce greenhouse gas (GHG) emissions, in response to a legislated requirement to do so put in place by the Province. The local government targets are:

- Municipal Official Community Plans (OCPs): City of Kelowna, District of Lake Country, District of Peachland and District of West Kelowna OCPs each include a target to **reduce GHG emissions from community activities by 33% by 2020 from 2007**. District of Peachland and District of West Kelowna OCPs also have a target to **reduce GHG emissions from community activities by 80% by 2050 from 2007.**
- Regional Growth Strategy (Final June 2014): "Work toward meeting the provincial target of reducing GHG emissions by 80% from 2007 levels by 2050."

3.2 Achieving the Vision, Goals and Targets

These are ambitious goals and targets, particularly in light of the projected increases of most of these pollutants under a "business-as-usual" scenario. The next chapter presents the strategies and actions identified for working towards these vision, goals and targets over the next five years. It is organized into five topic areas:

4 Clean Air Strategies and Actions

In support of the vision of clean and healthy air for current and future generations, the governments of this region have identified 16 strategies for implementation over the next five years (see Table 3). This section of the report provides a description of several actions per strategy that have been identified for implementing the strategies. Recognizing that there are many activities that need to be taken on by other organizations, businesses and citizens, this strategy also lists key activities that others need to do to support the Vision within each of the five topic areas.

Table 3. Summary of the Clean Air Strategies for the next 5 years

Sustainable Transportation	
Walking, cycling, public transit, carpooling and clean vehicles are the most accessible, affordable and efficient ways to get around.	
1	Integrate air quality requirements and targets into transportation and land use plans
2	Develop and deliver programs to encourage sustainable modes of transportation
3	Reduce emissions from vehicles on the road
Green Industry	
Commercial, forestry, agricultural and other industrial operations across the region make decisions that keep our air clean and clear.	
4	Reduce emissions from commercial fleets and diesel equipment
5	Aim to eliminate smoke from burning (agriculture, forestry & land clearing)
6	Manage pollutants from commercial operations
7	Regional coordination with industry
Clean Outdoor Activities	
Community members minimize air pollution from outdoor maintenance and recreation activities.	
8	Aim to eliminate backyard burning in residential neighbourhoods
9	Minimize pollutant emissions from yard maintenance activities
10	Minimize pollutants from recreation activities (ATVs, boats, etc)
Green Buildings	
Buildings are energy efficient, use green energy, and keep our air clean and clear.	
11	Reduce and/or eliminate smoke emissions from home fireplaces and woodstoves
12	Address emissions from household products (e.g. cleaning and painting)
13	Support green building, renovations and renewable energy in homes
Better Information and Awareness	
Community decision makers, businesses and citizens have access to clear, accurate information to help us make the best decisions to keep our air clean and clear.	
14	Improve local air quality data and information
15	Make local air quality information accessible to decision makers
16	Make air information available to all citizens and businesses

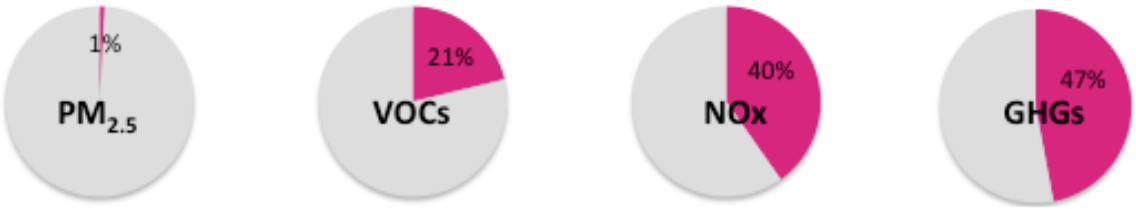
4.1

What Sustainable Transportation means in the Central Okanagan: Walking, cycling, public transit, carpooling and clean vehicles are the most accessible, affordable and efficient ways to get around.

How transportation impacts air quality: Research indicates that people living in more compact neighbourhoods tend to walk, cycle and take public transit more – and drive less – resulting in healthier citizens with lower levels of obesity and lower exposure to air pollutants. [11] This section incorporates strategies to support compact neighbourhoods with good infrastructure for alternative modes of transportation. Reducing the amount of fossil fuels used for vehicles reduces levels of pollutants that lead to formation of ground-level ozone and fine particulate matter in our air, which cause health affects and smog that makes the air hazy.

How transportation impacts climate change: Vehicles are the primary source of community-based greenhouse gas emissions. Reducing these emissions is vital to reducing our region's impact on climate change.

Amount of pollution that currently comes from our transportation choices: [12]



Reaching our goals and targets:

- Reducing $PM_{2.5}$: Particulate matter emissions from transportation come from older diesel engines. For example, diesel trucks manufactured in 2007 are ten times cleaner than pre-2007 trucks.
- Reducing VOCs, NOx and GHGs: these pollutants can all be reduced significantly by reducing transportation emissions. These reductions will need to come from a combination of: people living within walking distance of a town centre and close to transit, people walking, biking or taking transit more often, much shorter car trips,

[11] Issue paper: The Links between Public Health and Sustainable and Active Transportation, Transport Canada (http://publications.gc.ca/site/eng/426359/publication.html)
[12] Derived from the Provincial CEEI for the Central Okanagan (for GHGs), and the Okanagan High Resolution Inventory (for air pollutants).

etc. Appendix A outlines the results of a study that demonstrates an example scenario of how to achieve a 33% reduction in GHGs by 2020, and an 80% reduction by 2050, compared to 2007 emission levels (as per the targets that have been adopted by several of the Regional Partners).

What we are already doing as a region:

- The percent of trips by sustainable modes is beginning to increase in the Central Okanagan. Based on the 2007 and 2013 Travel Surveys, there was a doubling of transit mode share to 4.3% of trips (region-wide), and an increase in active modes of transportation from 7.2% in 2007 to 9.8% in 2013 (region-wide). This has led to a decrease of 2% in the share of trips by auto drivers. However, the overall number of trips has increase by 11% over the same period.
- smartTRIPS neighbourhood program, engaged Pandosy and Springvalley neighbourhoods in sustainable transportation initiatives, with the goal of increasing biking, walking, transit ridership, carpooling, and other smart options.
- Cash for Clunkers (2004 to 2009), and replaced by BC Scrap-it Program (2009 to present) which trade old cars for cash incentives for a new bike, transit passes, or more efficient vehicles.
- Anti-idling program including anti-idling street signs and decals, school based and corporate based campaigns (2011).
- Safe Routes to School program, which improved active transportation options for schools in the region, including Glenmore School (complete) and other schools currently in the process.
- Residents of Kelowna who register their gasoline-electric hybrid vehicle with the City of Kelowna are eligible to receive an ECO-PASS. The holder of an ECO-PASS receives free on-street parking for one year at any on-street parking meters in downtown Kelowna. Normal parking and time restrictions apply.
- Several outreach programs focused on vehicles, including: Clean Air Day, Car Free Day, Walk and Bike to School and Work weeks, and Carpool.ca week.
- Regional Growth Strategy Section 3.2.7.7: Central Okanagan regional partners agree to develop mixed use compact communities and facilitate the transformation of existing neighbourhoods so that residents can conveniently and safely travel by bus or by foot, bicycle and other forms of active transportation while ensuring the efficient movement of goods and services.

- RDCO regional active transportation plan: Provides a vision for a future bicycle and pedestrian network connecting significant destinations in the region, and provide alternatives parallel to Highway 97 and 33. Sufficient infrastructure is essential to obtain significant mode shift from vehicles to alternative modes of transportation that will reduce impacts on air and climate, and the most recent regional travel survey indicates a shift is beginning to occur towards these more sustainable modes of transportation.
- Transit Future Plan: Central Okanagan Region, 2011: The plan is designed to achieve a mode shift target of 7% by 2035, which means about four times more transit rides than the 2011 baseline year. This plan calls for establishing and extending the RapidBus line, stations and exchanges; establishing the Frequent Transit Network, and initiating aggressive rideshare marketing.
- Community Energy and Emissions Plans / Climate Action Plans developed in Kelowna, Peachland and Lake Country (draft) that include goals to reduce emissions from transportation and improve transit and active transportation within their respective jurisdictions.

All regional actions and strategies were developed and will be implemented in accordance with provincial and federal Acts and Regulations.

Regional Actions for the next 5 years:

Sustainable Transportation	
Strategy 1: Integrate air quality requirements and targets into transportation and land use plans	
1.1	**Incorporate clean air objectives, requirements and actions into regional and local transportation plans** Regional Services will participate in transportation planning processes to ensure air quality considerations are included. These considerations include: • Reducing the amount of emissions that result from transportation (reducing trip lengths, reducing single-occupancy vehicles on the road, etc.) by prioritizing sustainable modes of transportation during planning and development and ensuring they are safe and accessible to all (children to seniors), and • Reducing the amount of emissions people are exposed to, with a particular focus on vulnerable populations (siting new schools and care facilities set back from major roadways and truck routes, separating pedestrian and bike paths from major roads, etc). Guidance for these considerations is included in the BC Ministry of Environment Develop With Care Guidelines (2013).

Incorporate clean air objectives in development plans and design guidelines

1.2 Regional Services will collaborate with regional partner staff to create development guidelines for incorporating clean air objectives into development plans and design guidelines, providing consistency in approach across the region. These guidelines will include considerations for air pollutant and GHG emission reductions and the importance of reducing exposure of citizens to air pollutants. As one example, the Capital Regional District created Pedestrian and Cycling Master Plan Design Guidelines that contain several useful resources.[13] The BC Ministry of Environment's Develop with Care Guidelines also provide a good starting point.

Incorporate clean air technology and appropriately-sized vehicles into transit fleet

1.3 Regional Services will work with the partners of the Kelowna Regional Transit System (City of Kelowna, District of Lake Country, District of Peachland, District of West Kelowna, Central Okanagan Regional District and BC Transit) to incorporate the procurement of clean air technology and appropriately sized vehicles; as replacements for old diesel transit vehicles, particularly on routes with higher density of residences. BC Transit profiles a range of clean transit options and community examples

https://engage.gov.bc.ca/app/uploads/sites/391/2018/07/MoE-IntentionsPaper-Transportation.pdf

[13] https://bikehub.ca/sites/default/files/imce/pcmp_design_guidelines.pdf

Sustainable Transportation

Strategy 2: Develop and support policies and programs to encourage sustainable modes of transportation

Develop or support policies to reinforce sustainable transportation choices and attach a cost to unsustainable choices

2.1 The most effective means of reducing emissions is to reduce the amount of vehicle kilometres travelled in the region by prioritizing and encouraging walking, cycling, taking transit, and carpooling, and by discouraging single-occupancy vehicle trips. The Sustainable Transportation Partnership of the Central Okanagan (STPCO) will be undertaking a regional transportation plan process in the near future. During this process and beyond, the regional partners will explore a variety of methods for prioritizing sustainable modes of transportation, and discouraging unsustainable modes. Innovative programs and policies are being employed in cities throughout the world with great success, including commute trip reduction programs, parking management strategies (variable pricing), low emission times or zones, and congestion pricing on major or arterial roadways.

Develop and implement transportation demand management (TDM) programs for regional partners

2.2 Regional Services will work with the regional partners to demonstrate leadership by co-creating and implementing programs to encourage staff commuting by alternative modes of transportation. This work will build on the success of smartTrips and Bike to Work week to determine and remove barriers to mode shifting away from personal vehicles. Transportation demand management solutions may include incentives for walking, cycling or taking transit to work, rideshare matching, improvement of office infrastructure (showers and secure bike parking), and policies which remove financial incentives for driving.

Provide tools for major employers to develop and implement transportation demand (TDM) programs

2.3 Regional Services will share program tools and success stories from regional partners' active transportation programs to encourage program uptake by major employers throughout the region. TDM programs should be designed to include a variety of tools that provide incentives and remove barriers to using sustainable modes of transport, and include targets in support of regional air quality goals. One way to remove barriers is to have businesses and business associations install bicycle parking in front of retail and restaurant locations. As an example, Kelowna General Hospital developed a TDM Plan in 2012.

Develop and participate in sustainable transportation programs for youth and children

2.4 One such program is the Safe Routes to School program, which aims to identify and make infrastructure and design improvements to improve safety for walking and biking to school. The program has been offered at two schools in the region, and Regional Services will seek resources to continue and expand this program to other schools in the region, reaching between two and six schools per year. The selection of schools will need to be done in conjunction with School District 23, and also have the support and participation of the local municipality in the event infrastructure upgrades are required. Involvement of the Parent Advisory Councils is also key to successfully completing these projects. Tools could also be offered to all schools interested in promoting active transportation by connecting administrators, parents and students with existing resources, such as Hub for Active School Travel (HASTE).[14]

Sustainable Transportation

Strategy 3: Reduce emissions from vehicles on the road

Develop or support carpooling programs for trips to work, school, and events (neighbourhood carpooling)

3.1 Carpool or rideshare programs including vanpooling can be established for regional and municipal employees, and promoted to businesses and schools for trips to work, school, and events. Rideshare programs are estimated to lead to 3 to 9% reduction in overall vehicle kilometres travelled.[15] Regional services can work with local rideshare program providers to develop these networks. The Jack Bell Foundation in the Lower Mainland is an example of a successful vanpool program.

[14] http://www.hastebc.org

[15] Victoria Transport Policy Institute, Win-Win Transportation Emission Reduction; Strategies Smart Transportation Strategies Can Reduce Pollution Emissions And Provide Other Important Economic, Social and Environmental Benefits. 2012.

Develop anti-idling bylaws and a campaign to improve vehicle efficiency

3.2 Regional Services will work with partners to build on existing anti-idling signage to develop anti-idling bylaws for implementation throughout the region. Measures could include but are not limited to instating idle-free zones accompanied by progressively stronger penalties and fines for non-compliance, managing the timing of traffic lights in urban areas, and banning drive-thrus. The town of San Luis Obispo, CA banned drive thrus in 1982. Williams Lake, Duncan, Richmond, and numerous other municipalities in BC have implemented anti-idling bylaws, allowing municipalities to give tickets for offenses. These bylaws are supported by education and outreach campaigns – Idle Free BC offers campaign resources for all BC regions (https://www.toolkit.bc.ca/tool/idle-reduction-bylaw). Note that anti-idling requirements can be included within a general nuisance bylaw that also addresses noise and odour.

In addition to reducing idling, personal vehicle drivers can reduce emissions by buying more efficient vehicles, buying vehicles that are "right-sized" to the activities they use the vehicle for, and improving vehicle maintenance. Regional Services will identify opportunities to promote efficient vehicles and improved maintenance in conjunction with the idle reduction campaign.

Install and promote infrastructure for Electric Vehicles

3.3 Regional Services will work with local government and community partners to install electric vehicle charging stations around the region. This includes community locations such as pools and parking lots, as well as in making charging stations a requirement in new residential and commercial developments. The City of Vancouver has been successful in attracting corporate sponsorship of EV charging stations in three parks along English Bay, and has made strong bylaws to support EVs charging capacity in all new developments. Currently, 20% of the parking stalls in every building must include a receptacle for charging cars, and electrical rooms must include enough space to install any equipment necessary to provide charging for all residents in the future.

Develop, implement and share road dust management best practices

3.4 Regional Services, in collaboration with partner operations departments, will develop best management practices for reducing road dust based on the BC Ministry of Environment's best management practices for dust management and suppression (http://www.bcairquality.ca/reports/pdfs/roaddustbmp_june05.pdf), input from the BC Ministry of Environment staff, and other known practices such as those listed in Prince George's Clean Air Bylaw: use appropriate dust

suppressing liquids when sweeping roads or parking lots, and prohibit road and parking lot sweeping during an air quality advisory.

Encourage and support car share program(s)

3.5 Regional Services will host conversations with municipal, not-for profit, and business partners to explore regional or municipal car share programs. Regional measures could include providing free parking for carshare cars, and incorporating these vehicles into the partner fleets. A car share program has recently formed in Kelowna, and there may be opportunities to expand this to other areas. The City of Kelowna is currently piloting the use of the local OGO Car Sharing as an addition to the corporate fleet. Other successful examples include Modo, Car2Go, Zip Car, Kootenay Carshare Co-op, and the Victoria Carshare Co-op. Motorists who shift from car ownership to carsharing typically reduce their vehicle travel by 30 to 60%, and car share programs can lead to an overall reduction in vehicle kilometres travelled by 1 to 2%.[16]

Actions requested of others to achieve our vision:

Federal government	• Provide resources to support active transportation programming through the Gas Tax Fund. • Regulate the use of sand and salt on federal highways to reflect dust management best practices.
Provincial government	• Explore Province-wide AirCare program or other program to accelerate the turnover of older vehicles. • Offer resources to support public active transportation programs (Safe routes to school, etc.). • Re-establish funding for electric vehicle charging infrastructure and/or support additional electric vehicle charging infrastructure throughout the region. • Develop regulations to support environmental dust management best practices within the province. • Regulate the use of sand and salt on provincial highways to reflect dust management best practices. • Implement congestion pricing on provincial roads.

[16] Ibid

Local governments & Westbank First Nation	• Prioritize non-motorized transport in community planning and development. • Integrate transit and community planning to ensure higher density development aligns with current and future frequent transit networks. • Incorporate clean air and GHG emission reduction as objectives in municipal development plans.
Citizens	• Engage in active transportation, taking transit, trip sharing, and carpooling when possible. • Consider joining a car share rather than purchasing a vehicle, or to replace a second vehicle in a family. • Practice efficient driving when operating a motorized vehicle.
Businesses	• Update fleet management practices and procurement policies to include efficient drivers training, right-sizing vehicles and low (or zero) emissions vehicles. • Develop an active transportation program to encourage employees to leave their cars at home.

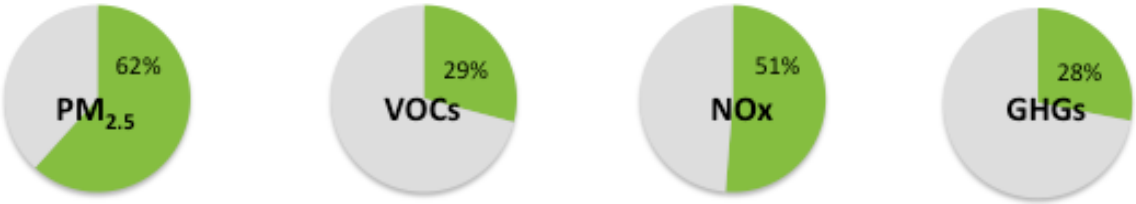
4.2

What Green Industry means in the Central Okanagan: Commercial, forestry, agricultural and other industrial operations across the region make decisions that keep our air clean and clear.

How industry impacts air quality: Our economy is supported by a mix of industry, agriculture, commerce, tourism, construction and services. The pollution from these activities can be reduced by targeting policies and programs at pollution sources that have the most impact (e.g. limiting open burning practices in agriculture operations, upgrading diesel equipment to reduce diesel particulate matter emissions in commercial fleets).

How industry impacts climate change: Historically our economy has been largely fueled by fossil fuels. This goal recognizes the need to separate a strong resilient economy from this dependence on fossil fuels by using cleaner technology, cleaner fuels, and becoming more efficient.

Amount of pollution that currently comes from commercial, forestry, agricultural and other industrial activities: [17]



Reaching our goals and targets:

- Reducing $PM_{2.5}$: the majority of these emissions are from industrial sources, which are regulated by provincial and federal authorities. The region can engage with industries to encourage clean air reporting and disclosure and use of best management practices, particularly in relation to dust control. Additionally, the region can promote a turnover of old diesel equipment that emits 10 times or more particulate emissions than newer equipment.

[17] Derived from the Provincial CEEI for the Central Okanagan (for GHGs), and the Okanagan High Resolution Inventory (for air pollutants).

- Reducing VOCs: household products, paints, cleaners contribute up to 23% of VOC emissions. Replacing these with low or no-VOC products can reduce this significantly. Up to 12% of VOC emissions come from commercial vehicles; improving the efficiency of heavy-duty commercial vehicles will reduce VOC emissions. Encouraging best management practices that reduce fuel evaporation would also reduce the level of VOC emissions.
- Reducing NOx: Over 50% of NOx emissions are attributed to commercial activities. The majority of these come from older vehicles and rail transportation. The region can promote a turnover of older vehicles and equipment to target these emissions, and lobby the provincial and federal governments to create a program to expedite the turnover of old vehicles.
- Reducing GHGs: businesses have an important role to play, accounting for over 25% of community GHG emissions. Key opportunities for reducing GHGs include making buildings more energy efficient, making fleets more efficient, producing more goods and food locally, and reducing the amount of waste going to the landfill (see Appendix A for one example scenario to achieve the regional GHG emission reduction targets). Each local government in BC is responsible for identifying targets, policies and actions for reducing community GHG emissions, and this plan aims to support these actions where there are co-benefits for improving local air quality.

What we are already doing as a region:

- Agricultural Wood Waste Chipping Program: Since 2004 the RDCO has offered a free program for orchardists who choose to chip wood waste into mulch as an alternative to burning it. Since the program started, over 70,000 cubic metres of wood have been composted instead of being burned, resulting in almost 1,000 tonnes of avoided particulate matter emissions, and avoiding the health-related repercussions of these emissions per year.
- The City of Kelowna and the Districts of Lake Country and Peachland have developed community climate action / energy and emissions plans that identify policies and actions needed to reduce GHG emissions. Kelowna and Peachland have begun implementation of these plans.
- In 2010, the Regional Waste Reduction Office and the City of Kelowna set up a Commercial Diversion Program in response to a study that indicator approximately 50% of solid waste from local businesses, institutions and multi-family properties

could have been diverted. Education was followed up with increased monitoring and scrutiny of loads and surcharges at the landfill.

Regional Actions for the next 5 years:

Green Industry	
Strategy 4: Reduce emissions from commercial fleets and diesel equipment	
4.1	**Incorporate clean fleet principles into regional partners' procurement policies** Develop a model policy of clean and green principles for the purchase and management of fleet vehicles. The Regional Services will work with representatives from regional partners' operations departments to identify important air quality and energy efficiency attributes for consideration in the purchase of new vehicles to inform the model policy. This demonstrates leadership to the business community. A strong example of a green fleet program is the Township of Langley's E3 Fleet. The Federal CCME is currently developing guidelines for local governments to identify mechanisms to reduce emission from diesel equipment, both in corporate operations and in the broader community.
4.2	**Promote clean fleet principles with businesses and other regional organizations** After regional partners adopt clean fleet principles, Regional Services will promote the model policy to key industry and business stakeholders in the region and encourage them to adopt similar policies. Promotion may also include directing businesses to existing programs that support this, such as Green Fleets BC, and the Federal SmartWay Transport Partnership program that is designed to help businesses reduce fuel costs while transporting goods in the cleanest most efficient way possible.
4.3	**Lobby the provincial government to implement a heavy-duty vehicle inspection and maintenance program** Regional Services will lobby the Province to implement a program that targets removal or retrofit of old high-emission diesel vehicles from the roads. Metro Vancouver recently completed a study identifying an inspection and maintenance program as the most cost effective approach to removing these high polluting vehicles (targeting trucks from 2007 and older model years): http://www.metrovancouver.org/services/air-quality/AirQualityPublications/2013HeavyDutyDieselVehiclePolicyOptions.pdf

Green Industry

Strategy 5: Aim to eliminate smoke from burning (agriculture, forestry & land clearing)

Expand Agriculture Wood Waste chipping program

5.1

The Agriculture Wood Waste chipping program has provided free chipping services for tree removal in orchards since 2004 and has prevented over 70,000 m3 of wood waste from being burned. The program is currently oversubscribed and has a waitlist. Pending budget approval, an expansion of this program could continue to prevent burning of wood waste. Regional Services will also explore the potential to expand the program through various options such as:

- Providing partial rebates for those who engage a private contractor to do the chipping.
- Charging a fee for the chipping service (on par with the cost of purchasing a burn permit).
- Obtaining funding from external agencies to expand the program to all agricultural operations.

Review, update and harmonize regional partner burning policies, bylaws and enforcement procedures

Regional Services will meet with partner staff to conduct a review of current practices for park and land management to identify opportunities for reducing or eliminating burning for these purposes. Although this strategy aims to reduce burning, it is recognized that the use of burning to reduce ground fuels and minimize hazards associated with wildfires is an important priority for the rural areas and neighbourhoods that interface with forest areas. Where alternatives such as chipping or composting are not feasible, burning may be the most appropriate means of reducing that hazard.

5.2

Additionally, the RDCO, each municipality and WFN have regulations relating to open burning. Regional Services will review each regulation and identify opportunities to harmonize the requirements across the region in accordance with the provincial and federal Acts and Regulations. Regional Services will review the purposes for existing burn permits, to determine whether further bans and enforcement are needed with respect to burning for the purposes of land clearing and management activities on non-agricultural land, or whether to consider banning open burning within all municipal boundaries, as has been done in several municipalities in BC (e.g. Smithers, Quesnel, Mission and Colwood). The RDCO and each municipality will continue to work collaboratively with agricultural land owners to reduce impacts of burning where feasible.

Green Industry

Strategy 6: Manage pollutants from commercial operations

Develop guidelines for commercial dust management practices

6.1 Regional Services will develop guidelines for dust management based on the guidelines developed for operational purposes (action 3.3). Regional Services will also explore developing a model bylaw such as Prince George's Clean Air Bylaw which requires anyone sweeping roads or parking lots to use appropriate dust suppressing liquids, prohibits road and parking lot sweeping during an air quality advisory issued by the city, and introduces measures to ensure dust does not escape from a property in a way that is likely to cause human health problems.

Regional partners to develop or complete corporate and community climate plans

6.2 Each regional partner will develop or complete corporate and community climate plans. The City of Kelowna and the District of Peachland completed these plans, the District of Lake Country has created a draft community plan, and the District of West Kelowna and Westbank First Nation have identified the need to complete these. BC Hydro (for municipalities) and the Province (for First Nations) provide funding to support completion of these plans. Regional services will support the implementation of these plans, where the actions identified are regional in nature and also assist with achieving the vision and goals of this plan.

Promote cleaner heating on residential and commercial developments

6.3 Regional Services will coordinate with planning staff at regional partners to develop model policies that promote, incent or require clean, renewable heating for buildings. This could include provisions for connecting to a future district energy system (where applicable), or for a minimum level of a new building's energy to be provided by renewable energy, for example 10% (e.g. solar hot water, solar photovoltaic, geoexchange heating and cooling). Examples are available through SolarBC (https://www.cleanenergybc.org/).

Develop a model policy for reforestation, retaining tree cover, and for planting shade trees

6.4 Regional Services will engage regional partner planners review current reforestation and shade policies, and develop a model policy that encourages or requires reforestation where trees are removed for development, preservation of trees or replanting of shade trees. Regional Services will explore the opportunity to create a model policy for green roofs on large new developments, particularly

where new or re-development involves removing tree cover, in order to mitigate urban heat island effect and reduce energy demand for cooling.[18]

Additionally, Regional Services will review parking lot shade policies in the local municipalities (including Kelowna's OCP urban design guidelines) stating that parking lots should have shade trees planted at one tree per four stalls. Also review best practices from other arid areas, such as the City of Sacramento, City of Fresno and City of San Diego – typical shading requirements of these policies are 50% of the parking lot. Regional Services will also explore the potential for using solar panel "trees" to provide shade and produce electricity as per the San Diego initiative and investigate developing a policy or bylaw to promote this.

Green Industry

Strategy 7: Regional coordination with industry

7.1	**Engage industry and major employers in voluntary annual clean air reporting** Regional Services will engage with key industry and major employers to participate in coordinated annual clean air reporting for the public. The region's largest emitters and largest employers will be encouraged to participate to share successes and plans for reducing their impact. Regional Services will review templates used in other regions, such as the Quesnel Air Quality Roundtable's reporting template (https://quesnelairshed.wordpress.com/reporting-template/), and customize based on the goals of this plan. Regional Services will also explore promoting this online.

Actions requested of others to achieve our vision:

Federal government

- Accelerate non-road diesel emission reduction standards for PM and GHGs.
- Incent purchase of cleaner, fuel-efficient new vehicles.
- Provide incentives or funding for diesel retrofits for on-road and non-road vehicles.
- Expedite pollution reduction programs for reducing VOCs in commercial and consumer products.

[18] For regulatory options for promoting green roofs in BC, see http://commons.bcit.ca/greenroof/files/2012/01/gr_regulatory_options.pdf. The City of Richmond, BC has had a green roof bylaw since 2008: http://www.richmond.ca/__shared/assets/Bylaw_838521490.pdf.

Provincial government	• Continue developing "best practices" for agriculture industry to reduce PM, ammonia, GHGs, methane and share these with regional partners. • Incent purchase of cleaner, fuel-efficient new vehicles. • Expand support of Sustainable Fleet Management Programs (such as E3 and GreenFleets BC, IdleFree BC). • Fund installation of clean fueling stations and electric plug-ins throughout the valley. • Expand the SCRAP-IT program to include heavy-duty vehicles. • Develop a regulated emission reduction program, e.g. AirCare, for heavy-duty vehicles. • Promote idle reduction and diesel engine retrofits as a means to reduce worker and resident exposure to diesel particulate matter. • Provide incentives or funding for diesel retrofits for on-road and non-road vehicles. • Adopt strengthened open burning regulation (OBSCR). • Adopt regulations and policies for all fire protection areas in the valley that reduces smoke attributed to forest harvest debris burning and prescribed burning. • Support district energy feasibility studies, and support development of district energy opportunities identified as feasible.
Energy utilities	• Continue energy conservation programs for major energy users. Support development of district energy opportunities identified as feasible.
Citizens	• Support local green businesses. • Report sightings of smoke plumes to the RDCO when venting index does not allow open burning.
Businesses	• Adopt clean air "best practices" for their sector. • Use low-impact goods movement such as low-carbon trucks and bicycle transportation. • Right-size delivery and service vehicles. • Reduce idling through behaviour change campaigns and technology upgrades. • Compost debris from agricultural operations.

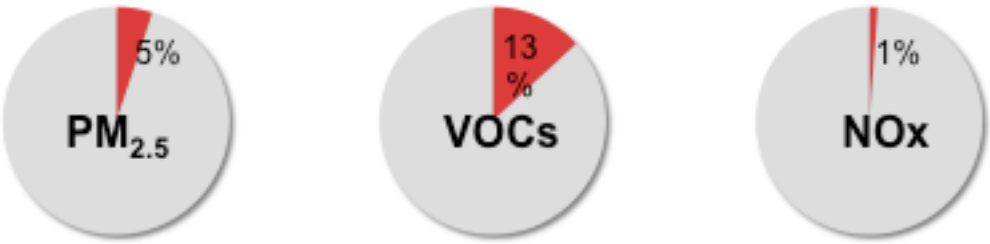
4.3

What Clean Outdoor Activities means in the Central Okanagan: Community members minimize air pollution from outdoor maintenance and recreation activities.

How outdoor maintenance and recreation impacts air quality: Burning organic material (wood, yard waste, brush) emits particulate matter, which can have negative health impacts in our airshed and create smog. Avoiding burning (through composting) or, where necessary, using clean burning practices are ways to minimize health impacts. Using cleaner-burning equipment (lawn mowers, off-road recreation vehicles and boats) reduces the amount of diesel particulate matter in our air – a known carcinogen.

How outdoor maintenance and recreation impacts climate change: Outdoor burning is a key contributor of carbon-based particulate matter and greenhouse gas emissions, which have a significant impact on climate change. Using less fossil fuels for off-road activities also reduces our impact on climate change.

Amount of pollution that currently comes from our outdoor maintenance and recreation activities: [19]



Reaching our goals and targets:

- Reducing $PM_{2.5}$: Outdoor burning (non-permit burning) accounts for approximately 5% of these emissions. Although not the largest source, this burning is often near residences and increases the level of exposure of people nearby. The region can reduce these emissions significantly through education, bylaws and enforcement.

[19] Derived from the Okanagan High Resolution Inventory (for air pollutants).

- Reducing VOCs: Outdoor burning (non-permit burning) accounts for about 8% of these emissions. An additional 5% of VOCs come from personal off-road vehicles.

What we are already doing as a region:

- Open Burning Information Line (September 2011)
- RDCO Bylaw No. 1066 now requires a venting index of 65 or greater for outdoor burning (August 2011)
- RDCO Regional Smoke Control Bylaw No. 773 (created 1998, amended 2011)
- Municipal open burning bylaws:
    - City of Kelowna, bylaw 10760
    - District of Lake Country, bylaw 612
    - District of Peachland, bylaw 1718
    - District of West Kelowna, bylaw 0114
- WFN Fire Protection Law No. 2005-11
- Outdoor Power Equipment Institute of Canada (OPEIC) Recycling Program drop off locations in Kelowna

Regional Actions for the next 5 years:

	Clean Outdoor Activities
	Review, update and harmonize regional partner burning bylaws and enforcement procedures
8.1	This is the same as action 5.2, listed in the Green Industry section. As described there, the open and backyard burning bylaws will be reviewed, updated and harmonized across the regional partners. This review may consider whether to introduce permits for backyard campfires or pits, providing an additional point of contact for education around safe and healthy burning practices.
	Encourage chipping and use of yard waste pick-up as alternatives to burning
8.2	Regional Services will provide education to alert residents about alternatives to burning, including, increasing awareness of the existing yard waste pick up programs across the RDCO, and creating education materials to be handed out by fire departments with burn permit requests. Regional Services will work in conjunction with the Regional Waste Reduction Office to determine further educational opportunities. Regional Services will also work with the fire

departments to create messaging about burning being the "last resort" to residents requesting burn permits.

	Engage with NORD and RDOS to adopt similar bylaws
8.3	Coordinate with staff at adjacent regional districts to undertake a review of existing open burning bylaws in the RDCO, RDOS and NORD. Staff will compare and highlight differences and prepare a report to all three boards recommending alignment where feasible.

Clean Outdoor Activities

Strategy 9: Minimize pollutant emissions from yard maintenance activities

	Promote existing programs for retiring old yard equipment
9.1	Identify all existing programs for retiring old yard equipment (for example, "Mow Down Pollution") and consolidate information into one brochure to promote programs on website and at local events. Additionally, Regional Services will work with Regional Waste Reduction Office staff to investigate the possibility of setting up temporary local drop off locations, potentially in conjunction with chipping, where residents could drop-off old equipment to be recycled with OPEIC (Outdoor Power Equipment Institute Canada).
	Develop a green purchasing and replacement strategy for two-stroke engines
9.2	Develop a checklist of clean and green principles for the purchase of new small engine maintenance machines for regional partners' fleets. Regional Services will work with representatives from Parks Services and the Regional Waste Reduction Office to identify important air quality and energy efficiency attributes for consideration in the purchase of new equipment. Green purchasing guidelines have been implemented in many jurisdictions including Metro Vancouver. Opportunities to accelerate the replacement of two-stroke engines will also be identified in collaboration with regional partners' parks departments. The City of Toronto implemented a greening strategy for small engine equipment used in City operations and by the broader public in 2009.

Clean Outdoor Activities

Strategy 10: Minimize pollutants from recreation activities (ATVs, boats, etc)

Install anti-idling signage at key boat ramps / docks

10.1 Design and install anti-idling signs at busy docks and boat ramps to eliminate unnecessary idling. Regional Services will be responsible for developing or obtaining the signs from the BC Ministry of Environment, identifying sign locations and coordinating sign installation. Bowen Island Municipality enacted Bylaw #210 in 2008 to eliminate unnecessary vehicle and boat idling.

Actions requested of others to achieve our vision:

Federal government	• Strengthen pollution control standards for yard maintenance machines. • Improve national non-road engine emissions and fuel standards applicable to recreation vehicles.
Provincial government	• Provide assistance with anti-idling signage and other educational resources. • Develop further educational information about the Venting Index.
Local governments & Westbank First Nation	• Implement and enforce open burning regulations to eliminate burning during times with low venting index throughout the Okanagan valley, and update bylaws as determined through the regional partners discussions. • Incorporate clean, green principles into yard maintenance purchasing decisions.
Citizens	• Compost yard waste on site, use yard waste collection carts, or bring yard waste for free drop-off at local landfills. • Never burn garbage. • Try low impact sports like sailing, canoeing, mountain biking and skiing to reduce emissions during recreation! • Purchase off-road vehicles with the least emissions, and turn off recreation vehicles when not in use. • Turn off vehicles when unloading boats. • Use electric or person-powered machines for yard maintenance.
Businesses	• Use electric or person-powered machines for yard maintenance.

4.4

What Green Buildings mean in the Central Okanagan: Buildings are energy efficient, use green energy, and keep our air clean and clear.

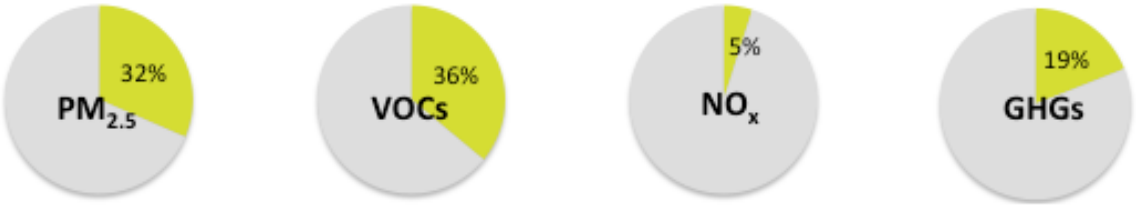
How buildings impact air quality: Replacing inefficient wood-burning appliances with cleaner energy sources reduces particulate matter emissions. Green building practices and products reduce pollution from solvents both inside and outside the building (like Volatile Organic Compounds – VOCs), which can lead to the formation of ground-level ozone.

It is important to consider potential impacts on human health in the transition to alternative sources of energy – particularly in relation to combustion-based energy sources (burning wood, biomass or waste).

How buildings impact climate change: Building and renovating our buildings to be more energy efficient will limit the amount of energy we need to use, and reduce impacts on global climate change.

Heat energy (for space heating and hot water) in the Central Okanagan primarily comes from burning fossil fuels. To reduce the reliance on fossil fuels, other cleaner sources of energy can be used – geoexchange systems, solar hot water heaters, biogas, and possibly clean biomass or waste-to-energy systems – all of which reduce our impact on global climate change.

Amount of pollution that currently comes from our heating and powering our buildings: [20]



[20] Derived from the Provincial CEEI for the Central Okanagan (for GHGs), and the Okanagan High Resolution Inventory (for air pollutants).

Reaching our goals and targets:

- Reducing $PM_{2.5}$: using woodstoves and fireplaces contributes up to 32% of PM2.5 emissions. Removing inefficient woodstoves and burning only dry wood can reduce this significantly.
- Reducing VOCs: household products, paints, cleaners contribute up to 23% of VOC emissions. Replacing these with low or no-VOC products can reduce this significantly. Using inefficient woodstoves also contributes VOCs – up to 13%.
- Reducing GHGs: buildings contribute almost 20% of the community GHG emissions. To reduce this, the region can create policies and programs that lead to greater diversity of housing types (especially smaller homes, duplexes, apartments), more energy efficient homes, more renewable energy and district energy systems, and reduced solid waste. See Appendix A for an example scenario for how to reduce regional GHG emissions to meet community targets.

What we are already doing as a region:

- Woodstove Exchange Program for RDCO residents (2001 to present)
- Public Education and Awareness programs such as Burn It Smart and Wood and Pellet Stove Workshops
- Kelowna Chamber of Commerce Green Business Awards
- Fortis BC Okanagan Energy Diet
- Solar BC community (Kelowna, Peachland) – these municipalities have adopted the Solar Hot Ready Regulations from the Building Code

Regional Actions for the next 5 years:

Green Buildings	
Strategy 11: Reduce and/or eliminate smoke emissions from home fireplaces and woodstoves	
11.1	**Develop an education campaign for clean burning wood stoves and practices** Identify best practices for wood burning stoves, develop educational material and implement a campaign to improve air quality emissions from wood stoves. In addition, include material about new cleaner burning stoves, proper maintenance and current bylaws. Regional Services will develop the campaign. The campaign could be modelled after the successful wood smoke behaviour change campaign conducted by the Puget sound Clean Air Agency.
11.2	**Continue providing incentives for the removal of uncertified wood stoves** The Province provided funding to the region through the Woodstove Exchange program from 2001 to 2013 that resulted in the removal of 658 inefficient woodstoves from the Central Okanagan. It is estimated that there are still numerous uncertified woodstoves installed in the region. The region will seek funding in order to continue to provide incentives to homeowners to remove these woodstoves (through the Provincial Woodstove Exchange Program and/or other sources). Lobbying the Province to maintain funding, and/or increasing partner funding. Regional Services, in coordination with retailers, will manage these incentives and continue to promote the program through brochures, the website, and social media.

Identify and implement further bylaw mechanisms to reduce emissions from wood stoves

11.3

Regional Services will explore updating the Regional Smoke Control bylaw to ban use of wood burning appliances during air quality advisories, as is currently done in nine BC municipalities (e.g. Prince George). Regional Services will work with each partner to harmonize these requirements in municipal bylaws and WFN regulations. Regional Services will also engage building inspection staff at all regional partners to clarify the need to only allow emissions certified stoves.

RDCO is authorized to establish a removal program for non-certified appliances, as noted in the BC MOE review of air quality bylaws in BC.[21] Regional Services will explore this option further. Revelstoke, Terrace, Smithers, Houston and Burns Lake all have provisions for removal of non-certified appliances. Furthermore, Regional Services will explore updating the bylaw to ban all new wood burning appliances in new developments. Harrison and 100 Mile House have bylaws that ban all new wood burning appliances.

Green Buildings

Strategy 12: Address emissions from household products (e.g. cleaning and painting)

Review and update purchasing policy to remove VOCs and other indoor pollutants

12.1

Regional Services will work with the purchasing departments of the RDCO and develop model guidelines for regional partners that eliminate the purchase of substances that contain VOCs and other indoor pollutants wherever alternatives are available. This will also include a list of alternatives to replace the harmful substances. Metro Vancouver has a green procurement policy

(https://vancouver.ca/green-vancouver/sustainable-purchasing.aspx).

[21] 2011 Inventory of Air Quality Bylaws in British Columbia: Vehicle Idling, Open Burning, and Wood Burning Appliances, BC MOE, http://www.bcairquality.ca/reports/pdfs/bylaws-2011.pdf, page 84

Expand website information on low emission products and incorporate indoor air quality

12.2 Develop online information for residents and businesses on low emissions products and information on indoor air quality. Include information about products that contain VOCs, radon and other harmful pollutants, their green replacements, where to buy and proper disposal of old products. Regional Services will research, develop and/or link to materials to be included in the current air quality information page. Share the regional guidelines developed in action 12.1. Refer to the City of Vancouver's Sustainable Programs for Businesses and Employees web page: https://vancouver.ca/green-vancouver/sustainable-programs-for-businesses.aspx.

Green Buildings

Strategy 13: Support green building, renovations and renewable energy in homes

Coordinate regional education campaign on efficient homes and clean energy and lobby utilities to provide further incentives

13.1 Regional Services will work with regional partners to develop an education campaign on energy efficient homes and clean energy for homeowners. This education and outreach campaign will include information on existing government and energy utility rebate programs, as well as information resources. Regional Services will seek opportunities to obtain funding for this campaign from other agencies, such as energy utilities (Fortis and BC Hydro).

Identify opportunities to integrate renewable energy into community plans and policies and share with regional partners

13.2 Regional Services will work with regional partner planners to incorporate feasible renewable energy policies into community and development plans and policies. Local governments in BC have authority to include requirements for renewable energy into Development Permit Areas, or include requirements with re-zoning approvals. These opportunities, as well as potential for designating district energy areas, will be explored with this working group.

Actions requested of others to achieve our vision:

Federal government	• Reduce allowable emission limits on building- related products (e.g. cleaning, painting, sealing, solvents). • Re-instate energy efficiency and renewable energy grants for homeowners.
Provincial government	• Explore regulatory and non-regulatory options to address residential wood burning and fuel oil devices at point of sale. • Adopt a strong Solid Fuel Burning Domestic Appliance Regulation (SFBDAR) that leads to reduced emissions from residential burning. • Continue to increase the energy efficiency requirements for new buildings through greening the BC Building Code. • Re-instate energy efficiency and renewable energy grants for homeowners. • Incorporate requirements for HEPA filters in buildings adjacent to major roadways to reduce exposure to traffic emissions.
Citizens	• Remove old woodstoves or exchange them for low-emission EPA approved wood or pellet stoves. • Always season wood for one year before burning. • Ask builders and realtors for Energy Ratings of new homes and consider this in your buying decision. • Conduct a building energy audit to find out how efficient your home or building is and what you can do to improve it. • Purchase low-emission products for cleaning, painting, sealing, etc. • Reduce energy use by turning down heat or reducing air conditioning, especially in rooms that aren't in use.
Businesses	• Conduct a building energy audit to find out how efficient your building is and what you can do to improve it. • Incorporate low emission products (low VOC paints, solvents, cleaners, carpets, sealants, etc.) into a sustainable purchasing policy for corporate purchases. • Plant deciduous trees on the south and west of your building - providing shade in the summer, but allowing winter sun through.

4.5

What Better Information and Awareness means in the Central Okanagan: Community decision makers, businesses and citizens have access to clear, accurate information to help us make the best decisions to keep our air clean and clear.

How better information and awareness impacts air quality: Certain pollutants (e.g. fine particulate matter and ground-level ozone) are known to cause severe health and environmental impacts. By improving our understanding of the critical sources, dispersion and effects of these pollutants we can create more targeted policies and programs that reduce the risk of health impacts for our citizens and keep our air and views clear.

How better information and awareness impacts climate change: The majority of greenhouse gas emissions in our community come from our transportation choices. Engaging citizens about the impact of their choices will enable our collective response to limit our impact on global climate change.

What we are already doing as a region:

- Sharing information on citizens' role in reducing air pollution through programs such as smartTRIPS, the Woodstove Exchange Program, the chipping program, alternatives to outdoor burning, Clean Air Day, Car Free Day, Walk and Bike to School and Work weeks, and Carpool.ca week.
- Provide educational resources on the Regional District's website, including information on measuring air quality and how citizens can improve air quality while at home, while moving around the region, and while at work.
- Over the last 13 years, the RDCO staff have held several outreach events, as well as taken calls on hotlines designated for air quality programs. Through these, over 175,000 people in the region participated in a regional event or activity to learn about air quality; 85,000 of those are since 2007, as tracked by Regional Services.

Regional Actions for the next 5 years:

Better Information and Awareness

Strategy 14: Improve local air quality data and information

Lobby Province to install additional air quality monitoring stations

14.1 Regional Services will work with regional partners' staff and elected officials to lobby the provincial government for additional stationary or mobile emissions monitoring stations. The regional partners can make appropriate sites available for monitoring station installation. In addition to monitors that track the key pollutants of concern to health, lobby the province to monitor, research and report on visibility impacts in the region. A system to monitor visibility is currently implemented in the lower mainland.

Participate in research to improve understanding of key pollution sources

14.2 Regional Services will encourage and participate in provincial, federal, and university-led research programs that increase local knowledge of key pollution sources in the valley. Research may include but is not limited to updating and refining the air pollution inventory for the Okanagan, understanding levels of transboundary sources of pollutants (particularly ground-level ozone), determining which precursors are most influential to air quality, and conducting field campaigns to map levels of pollutants throughout the valley. Regional partners can assist by providing data to support analysis (e.g. local transportation models). Furthermore, the region will support the research and evaluation of visible air quality.

Better Information and Awareness

Strategy 15: Make local air quality information accessible to decision makers

Coordinate ongoing working group of air quality experts in the Central Okanagan

15.1 Regional Services will convene a multi-stakeholder advisory group comprised of federal, provincial and local air quality experts and practitioners to share and review new air quality information, assess information gaps and identify additional information needs. Note that the Okanagan Air Quality Technical Steering Committee was previously in place in this region. Examples of ongoing regional Air Quality Advisory Groups are the Sea to Sky Clear Air Society, Clean Air Hamilton and Quesnel Air Quality Roundtable.

Coordinate ongoing working group of staff at regional partners

15.2 Regional Services will convene responsible staff at regional partners to discuss best practices for integrating clean air goals into community plans, regulations, and policies. This will serve as an opportunity to harmonize policies across the region. Regional Services can provide new research about integrating best practices into policy, potential funding programs, etc. As an example, Metro Vancouver has convened a staff committee that meets quarterly to discuss community climate action.

Explore developing an air quality impacts evaluation tool to inform development decisions in Central Okanagan

15.3 Regional Services will collaborate with Interior Health and local government partners to develop guidance on how to best inform staff and elected officials on potential air quality impacts associated with development and infrastructure projects prior to their approval. This may build towards the development of a Health Impact Assessment tool, incorporating air quality considerations into the development planning process. Ingham County, Michigan has had success with this approach, expanding beyond air quality to consider multiple health factors as part of the development planning process.

Better Information and Awareness

Strategy 16: Make air information available to all citizens and businesses

Develop and deliver a comprehensive citizen education program

16.1 Regional Services will work with regional partners to develop and roll-out a comprehensive engagement and education campaign for citizens and businesses. This may include activities such as supporting air quality education in local schools, enhancing information on the RDCO / City of Kelowna website to include multi-media resources appropriate for various audiences (schools, adults, businesses, seniors, etc.), producing venting index educational videos and an air quality action guide for households, and working with partners to create real-time visibility outreach tools for the Central Okanagan, as has been done for the Fraser Valley (www.clearairbc.ca). The Regional Communications Coordinator will assist in creating a communications strategy to disseminate education materials.

Measure and share progress with the public and interested stakeholders

16.2 Regional Services will prepare an annual progress report that can be shared with the public and interested stakeholders. A graphically accessible, short report

card-style summary can be shared via social media, email and the regional air quality website. Toronto's The Living City Report card offers an example of how to succinctly illustrate progress towards performance measures to a public and multi-stakeholder audience (https://reportcard.trca.ca/living-city-report-card).

Actions requested of others to achieve our vision:

Federal government	• Update and refine air pollutant emission inventory for the Okanagan. • Participate and contribute information and resources to the advisory group in an ongoing manner.
Provincial government	• Procure additional stationary and mobile monitoring stations for ongoing air quality monitoring on the Central Okanagan. • Conduct a field campaign to map levels of PM2.5 and ozone through the valley. • Lead research to determine if the diurnal ozone patterns are shifting in Kelowna over the last 20-year record (providing a better indication of the primary ozone sources). • Lead research to understand level of transboundary sources of emissions. • Participate and contribute information and resources to the advisory group in an ongoing manner. • Lead research to determine which precursors are most influential. • Continue to provide Community Energy and Emissions Inventory on a biannual basis. • Create outreach videos on VOC's and their role in Ground Level Ozone, PM, and resulting health impacts. • Maintain and consider increasing the carbon tax and implement other policies to help achieve GHG emission reduction targets.
Local governments & Westbank First Nation	• Incorporate air quality and climate change impacts into policy decisions. • Stay informed about new regionally relevant air quality and climate change information. • Participate and contribute information to the advisory group in an ongoing manner. • Complete community energy and climate action plans to help achieve GHG emission reduction targets.

Citizens	• Review educational materials provided by the regional partners to better understand the air quality issues and impacts in the Central Okanagan. • Report poor air quality and bylaw infractions to the Regional District when you see them. • Stay informed about new regionally relevant air quality and climate change information, including the annual regional air quality report card. • Participate in regional and local air quality programs and initiatives.
Businesses	• Review educational materials provided by regional partners to better understand the air quality issues and impacts in the Central Okanagan. • Stay informed about new regionally relevant air quality and climate change information, including the annual regional air quality report card. • Participate in regional and local air quality programs and initiatives.

5 Implementation and Monitoring

5.1 Implementation plan summary

Effective implementation of this Clean Air Strategy will require dedicated staff resources and funding for disbursements. The current program is staffed by one full-time coordinator, and has an annual budget of $80,000 to support the Agricultural wood chipping program. These resources have resulted in reduced emissions from specific activities, as discussed in previous sections. To fully implement this plan and achieve emission reductions in more areas, additional funding will be needed. The table on the following page lists the identified strategies, and for each strategy provides a high-level indication of:

Potential Emission Reductions: The potential for emission reductions for the identified pollutants ($PM_{2.5}$, VOCs, NOx, GHGs) are provided on a scale from 0 (no impact) through to 3 (high impact). These are indicated by the following icons:

○	*No impact*
◔	*Low impact* • the targeted source contributes less than 5% of the region's emissions of the pollutant; and/or • the actions identified are mostly education and information based which have very little measurable emission reduction impact, but are still important for raising awareness.
◕	*Moderate impact* • the targeted source contributes 5% - 15% of the region's emissions of the pollutant; and/or • the actions identified are incentive-based, or only target a subset of the full emission source.
●	*High impact* • the targeted source contributes greater than 15% of the region's emissions of the pollutant; and/or • the actions identified are regulatory-based and target the majority of the emission source.

Public Engagement Response: Indicates the relative number of responses from the public that liked the strategy during the two-week online public engagement period.

Regional Services Staff: This provides a high-level estimation of the level of effort that will be required by Regional Services staff to implement each of the strategies. The estimates are provided using a "Full-Time Equivalent" measure, spread over 5 years. The current estimate indicates that 8 FTEs will be required over 5 years – an average of 1.5 FTE per year to implement actions identified in this plan. Currently Regional Services has an Air Quality Coordinator position (1 FTE), and additional support from other staff (for example, the Active Transportation Coordinator) that can assist with implementing this plan over time. It is estimated the majority of actions can be implemented with current staffing levels.

Note that strategy 2 identifies expanding the active transportation programs, and this would require additional part time staff (approximately 0.5 FTE for 5 years). Shared funding for this position could be explored with the School District in relation to expanded school programs.

Estimated Additional Funding Needed: A high-level estimate is provided for proposed additional budget items that are estimated to go beyond the current level of funding. These items include:

- Sustainable transportation outreach programs - $20,000/year (strategy 2 and 3).
- Increasing the annual funding for the Agricultural Wood Waste program by 25% (strategy 5).
- Providing incentives for removal of inefficient woodstoves because funding from the provincial Woodstove Exchange program was on hold during 2014 and its continuation is under review, additional local or other sources of funding will be needed maintain this program (strategy 11).
- Air quality education and outreach for various initiatives, including woodstoves, backyard burning, open burning; as well as hosting workshops and meetings – approximately $10,000/year (several strategies).

These additional budget items may be funded through various funding mechanisms – including provincial, federal, or other agency funding programs (as available), matching funds from industry partnerships, considering fees for services / increased permitting fees, or increases in the annual Air Quality programs budget – to be determined during annual budget planning. These are estimated to be an average of $75,000 per year for 5 years to fully implement the plan.

		Potential for Achieving Emission Reductions				Public Consultation Response	Existing Regional Services Staff [FTE per year]	Identified Additional Staff (FTE)	Additional Staff salary	Current funding	Estimated Additional Funding Needed
		PM2.5	VOCs	NOx	GHGs						
Sustainable Transportation											
1	Integrate air quality requirements and targets into transportation and land use plans	◔	●	●	●		0.05				$ -
2	Develop and support policies and programs to encourage sustainable modes of transportation	◔	◕	◕	◕		0.01	0.5	$ 35,000		$ 9,000
3	Reduce emissions from vehicles on the road	◕	●	●	●		0.09				$ 11,000
Green Industry											
4	Reduce emissions from commercial fleets and diesel equipment	◕	◕	◕	◕		0.09				$ 1,000
5	Aim to eliminate smoke from burning (agriculture, forestry & land clearing)	●	◕	○	○		0.1			$ 80,000	$ 22,000
6	Manage pollutants from commercial operations	◕	◔	◕	◕		0.06				$ 1,000
7	Regional coordination with industry	◔	◔	◔	◔		0.1				$ 4,000
Clean Outdoor Activities											
8	Aim to eliminate backyard burning in residential neighbourhoods	◕	◔	○	○		0.11				$ 1,900
9	Minimize pollutant emissions from yard maintenance activities	◔	◔	○	○		0.04				$ -
10	Minimize pollutants from recreation activities (ATVs, boats, etc)	◔	◔	◔	◔		0.02				$ 500
Green Buildings											
11	Reduce and/or eliminate smoke emissions from home fireplaces and woodstoves	●	◕	○	○		0.12			$ 10,000	$ 20,000
12	Address emissions from household products (e.g. cleaning and painting)	○	◔	○	○		0.03				$ -
13	Support green building, renovations and renewable energy in homes	○	○	○	◕		0.04				$ -
Better Information and Awareness											
14	Improve local air quality data and information	○	○	○	○		0.03				$ -
15	Make local air quality information accessible to decision makers	○	○	○	○		0.06				$ 2,600
16	Make air information available to all citizens and businesses	○	○	○	○		0.08				$ 2,000
Estimated Annual Resources							1.0	0.5	$ 35,000	$ 90,000	$ 75,000
Total Estimated Additional Resources to fully implement the Plan							1.5				$ 110,000

** NOTE: These strategies include actions that may require additional budget in other departments - for example investing in transit, cleaner diesel equipment, electric vehicle infrastructure, etc. to be determined prior to implementing the action.*

5.2 Funding the plan

The following resources may be accessed to support the implementation of this plan.

Organization	Program / Fund	Details
BC Ministry of Transportation and Infrastructure	Cycling Infrastructure Partnerships Program (CIPP)	Local governments may apply for up to $100,000 to this cost share program to build new, safe and high-quality cycling trails, bike lanes, bike lockers and more. Bike BC is one of the largest investments the Province has ever made in building and improving cycling infrastructure in communities across the province. (https://www2.gov.bc.ca/gov/content/transportation/funding-engagement-permits/funding-grants/cycling-infrastructure-funding)
Federation of Canadian Municipalities Green Municipal Fund (FCM GMF)	Sustainable Neighbourhood Action Plans	Grants to cover up to 50% of eligible costs a maximum of $175,000, to undertake eligible plans. Funds work to build upon an existing municipal sustainable community plan or strategy, and must include a vision, goals, targets, and actions. Activities may include energy and sustainable transportation. All communities could use this to support local planning initiatives.
FCM GMF	Fleet Fossil Fuel Reduction	Grants to cover up to 50% of eligible costs a maximum of $175,000, to undertake eligible plans. Project must demonstrate the potential to increase fuel efficiency by at least 20% (reduction in liters of fuel consumed per 100 kilometers travelled) for a municipal fleet or a portion of a municipal fleet. All communities could use this to improve their fleet management practices.
FCM GMF	Modal Shift	Grants to cover up to 50% of eligible costs a maximum of $175,000, to undertake eligible plans. Projects must demonstrate the potential to reduce vehicle kilometers travelled in single occupancy vehicles for a target population by encouraging alternative modes of travel. Communities could use this to support active transportation programs.
BC Ministry of Community Sport and Cultural Development	Infrastructure Planning Grant Program	Grants up to $10,000 are available to help improve or develop long-term comprehensive plans that include, but are not limited to capital asset management plans and community energy plans. West Kelowna could use this towards a CEEP. With a CEEP, West Kelowna could access other BC Hydro energy

		efficiency funding and programs. All communities could use this support local planning initiatives.
BC Ministry of Energy and Mines	First Nations Clean Energy Business Fund	Offers $30,000 in funding to First Nations communities to complete Community Energy Plans. Westbank First Nation could use this to conduct a Community Energy Plan.
BC Ministry of Transportation and Infrastructure	Cycling Infrastructure Partnerships Program	Funds the construction of new transportation cycling infrastructure (cycling to work, school, or errands) as a means of reducing traffic congestion and green house gas (GHG) emissions. All British Columbia municipalities and regional districts are eligible to apply for up to $100,000 in CIPP funding.

5.3 Monitoring progress and reporting

It is important to track how effective a strategy document is in assisting to achieve the vision and goals. In order to do this, Regional Services will create a brief annual summary that demonstrates how the region's air quality is changing, and the progress made in implementing the Clean Air Strategy that reports on the three summary measures identified in Section 3:

- Levels of fine particulate matter and ground-level ozone remain below the Federal or Provincial air quality objectives and standards.
- There is continuous improvement in the levels of annually-averaged air pollutants for fine particulate matter and ground-level ozone.
- Communities are reducing total greenhouse gas emissions. (available on a biennial basis)

The summary will include a selection of indicators to provide more information about how we are doing in implementing the plan, as follows:

- Number of exceedances of provincial and national objectives and standards
- Number of days that the region is under an air quality advisory
- Number of air quality complaints (provides an indication of visual air quality)
- Number of days with impaired visual air quality (to be defined when visual air quality monitoring and methodology are in place for the Central Okanagan)
- Percent of planned actions undertaken; completed

- Transportation mode split: percent of single-occupancy vehicles compared to percent of sustainable modes (data: Household Travel Survey conducted every five years)
- Average vehicle kilometers travelled (data: Regional Transportation Model updated every five years)

In addition to the indicators above that track how we are doing relative to the vision and goals, it is also important to track the effectiveness of specific actions or programs implemented. A simple framework to evaluate programs and activities' success is important to keep the plan on track and allow for course corrections during implementation. The following list provides an outline of potential indicators that require minimal effort to track, yet provide a snapshot of the individual program's efficacy, and therefore, the plan's success:

- Program cost: Operating cost and resources (FTE)
- Action complete: Yes/No/Percent progress
- Impact: Estimated tonnes of pollution avoided (for specific pollutant(s) being targeted, where feasible)
- Engagement: Number of people/businesses engaged or participating
- Number of [insert action to be measured]: Numerical value
    - E.g. woodstoves changed out, schools that have completed the safe routes to school program, participants in Bike to Work week

After the next five years of implementation, this plan will be reviewed and updated in light of the progress made.

6 Conclusion

The regional partners of the Central Okanagan continue to collaborate to maintain and improve the quality of the air, and to reduce our impacts on global climate change. These are ambitious goals. Although some pollutants are forecast to decrease over time due to improvements in efficiency of our vehicles and buildings, most pollutants are still forecast to grow over time. This Strategy represents the regions' commitment and planned efforts to reduce these emissions. However, it is clear that significant ongoing action by all levels of government, by businesses and by citizens will be required to keep our air clean and healthy for current and future generations.

Appendix A

The following depicts one potential scenario under which the region could achieve the GHG emission reduction targets identified by local governments in the region (33% reduction by 2020 and 80% reduction by 2050, relative to 2007 levels). This scenario was developed to inform the GHG emission reduction targets for the Central Okanagan Regional Growth Strategy and is outlined in a report *GHG Implications of Land-Use Scenarios for the RGS, 2012*. Note that each community's climate action plan may outline a different set of reduction measures to reach the same overall reduction.

Sustainable Transportation:

- Average trip length by car is cut by 35%, or people travel by vehicle about 1/3 less than they currently do – either through shorter trips, or taking less trips overall
- Number of homes within walking distance of a town centre increases 10-fold (by 2020) and 50-fold (by 2050)
- Number of homes within walking distance of frequent public transit doubles (by 2020) and triples (by 2050)

Green Industry:

- Solid waste production: declines 50% to 60% per capita
- Energy used in buildings: natural gas use declines 10% (2020) and 20% (2050)
- New buildings: 50% to 60% more efficient than the average existing building
- 20% of the existing buildings are retrofit for a 25% energy savings by 2020 and 50% are retrofit by 2050
- Agricultural production doubles and 80% of what is produced is locally consumed (up from 20%)
- Total forest cover doubles

Green Buildings:

- Only 30% of new homes are detached (by 2020, and 10% by 2050); the rest are apartments/ townhomes
- 31,000 homes are attached to district energy or geoexchange systems (by 2020, and 86,000 by 2050)
- Solid waste production declines by 50% per capita (by 2020 and 60% by 2050)
- Energy used in buildings: natural gas use declines by 10% and electricity increases by 10% (by 2020, and 20% by 2050)

- New homes are 50% more efficient than the average existing home (by 2020, and 60% by 2050)
- 20% of existing homes are retrofit for a 25% energy savings (by 2020, and 50% of homes are retrofit by 2050)