

A CLIMATE PROGRAM FOR THE CITY OF CALGARY



2017 February

Table of Contents

1.	Introduction	3
2.	Risk.....	3
3.	A Changing Context	5
	3.1 Federal and Provincial Direction.....	5
	3.2 Council and Corporate Direction	7
4.	A Changing Climate	8
5.	The Climate Program	10
	5.1 Climate Resilience Plan	12
	5.1.1 Adaptation.....	13
	5.1.2 Mitigation.....	14
	5.1.3 Engagement, Communication and Education	17
	5.1.4 Plan Development Timeline.....	18
6.	The Path Forward	19

1. INTRODUCTION

Issues facing municipalities – such as climate change – are increasingly complex and require collaborative action and multiple perspectives for effective planning and decision-making. The City of Calgary (The City) has a long history of developing actions to reduce emissions and build resiliency to climate change. In order to manage the effects of climate change effectively, a coordinated approach is required that will result in effective management practices, business and budget prioritization and strategic oversight.

The consequences of climate change are wide spread and well known in Calgary. It includes the increasing frequency and magnitude of climate-related extreme events; events that will intensify and become more frequent in the future as the release and accumulation of GHGs persists. Extreme weather events have and will continue to cause significant loss in the form of impacts on communities - human, infrastructure, economy and ecosystems.

The local, provincial, national and international context has shifted over the past few years to a point where the majority of the international community has agreed to reduce emissions. The Canadian and Alberta Governments as well as the City of Calgary have put goals and measures in place to reduce carbon, become more energy efficient and reduce infrastructure, human and environmental risks to the impacts of severe weather events.

Climate risks, although complex and multi-dimensional, can be managed like any other business risk. Planning can lead to cost-effective adaptation measures rather than responding to changes or events as they happen. The City is developing an integrated Climate Program that will prepare citizens and City assets to reduce carbon and decrease risks from climate changes.

This report provides an update on the current context in Calgary, while providing a process and timeline for the development of the program.

2. RISK

The World Economic Forum in its annual assessment of world risks indicated that the year 2016 marked “a forceful departure from past findings, as the risks about which the Report has been warning over the past decade are starting to manifest themselves in new, sometimes unexpected ways and harm people, institutions and economies.”¹ In its annual assessment of 2017, the report showed that climatic changes had catapulted its way to the top of the list of concerns. A catastrophe caused by extreme weather events is seen as the biggest potential threat to the global economy in 2017 (Figure 1).

¹ WEF – World Economic Forum (2017). The Global Risks Report 2017. 12th Edition. Retrieved from http://www3.weforum.org/docs/GRR/WEF_GRR17.pdf

2013	2014	2015	2016	2017
Severe income disparity	Income disparity	Interstate conflict with regional consequences	Large-scale involuntary migration	Extreme weather events
Chronic fiscal imbalances	Extreme weather events	Extreme weather events	Extreme weather events	Large-scale involuntary migration
Rising greenhouse gas emissions	Unemployment and underemployment	Failure of national governance	Failure of climate-change mitigation and adaptation	Major natural disasters
Water supply crises	Climate change	State collapse or crisis	Interstate conflict with regional consequences	Large-scale terrorist attacks
Mismanagement of population ageing	Cyber attacks	High structural unemployment or underemployment	Major natural catastrophes	Massive incident of data fraud/theft

FIGURE 1 - TOP 5 GLOBAL RISKS (LIKELIHOOD)

Calgary is becoming increasingly vulnerable to a range of impacts from climate change including floods, droughts, rising temperatures and more frequent and intense storm events. Calgary's municipal services and infrastructure are increasingly affected by these events; therefore it is important for The City to be prepared for the climate of the future.

In recent years, Calgary has seen an increased frequency and intensity of disasters² for example the 2013 Flood, 2015 Snowtember and hail storms, with Alberta being one of the provinces that has been hardest hit thus far in terms of frequency and cost of natural disasters.³ In Alberta alone insured losses since 2010 has climbed to almost \$8 billion. Long-term financial impacts of natural disasters are estimated to cost Canadians on average \$5 billion per year by 2020 and \$21-\$43 billion per year by 2050 in infrastructure damages, healthcare costs, and reduced productivity of Canadian industry and lost labour hours.⁴ Projected climate change will affect certain groups of people more than others and particularly groups located in vulnerable areas and the poor, young, old, or sick⁵.

With the additional financial impact of \$6 million from the Provincial carbon levy (\$20 per tonne of carbon) in 2017 and increased levy to 2022 (\$50 per tonne of carbon) from the Federal Government, The City needs to safeguard and prepare the community and the Corporation.

² Richardson, G. R. A. (2010). Adapting to climate change: an introduction for Canadian municipalities. Natural Resources Canada. Ontario: Waterloo University Press.

³ TD (2014). Special Report. TD Economics. Natural catastrophes: A Canadian economic perspective. Retrieved from <http://www.td.com/document/PDF/economics/special/NaturalCatastrophes.pdf>

⁴ TD (2014). Special Report. TD Economics. Natural catastrophes: A Canadian economic perspective. Retrieved from <http://www.td.com/document/PDF/economics/special/NaturalCatastrophes.pdf>

⁵ US EPA – Climate Change Impacts on Society (2016) <https://www.epa.gov/climate-impacts/climate-impacts-society>

Risk management considerations that need to be addressed include: an incomplete understanding of The City's vulnerability to the effects of climate change; financial impact of changes required to adapt to and mitigate to climate change; uncoordinated or insufficient planning for and reaction to risks caused by a changing climate; and/or insufficient or unbalanced resources being assigned to priority areas related to climate change.

Administration is developing a comprehensive Climate Program that includes both climate change mitigation and adaptation strategies. Strengthening the role of The City in climate resilience will equip the corporation with tools and actions to address climate change risks and support the community.

3. A CHANGING CONTEXT

The Global Commission on the Economy and Climate (Stern, 2014⁶) reported that well designed policies in resource efficiency, low carbon infrastructure investment and stimulating low carbon innovation will make growth and climate objectives mutually reinforcing both in the short and medium term. In the long term if climate change is not tackled, growth itself will be at risk.

In 2015, the United Nations Framework on Climate Change COP21 adopted the first international climate agreement (Paris Agreement) by over 194 countries. The broad goal of the agreement is to keep global temperatures from rising less than 2°C from pre-industrial levels, in an effort to stave off the most catastrophic effects of rising sea levels. In Canada the temperature has already increased by 1.6°C over the last 70 years, a higher rate of warming than in most other regions of the world. All levels of government in Canada has already started to take action to adapt and mitigate climate change and strengthen their local economies.

3.1 FEDERAL AND PROVINCIAL DIRECTION

In December 2016 Canada's Federal Government released the Pan-Canadian Framework on Climate Change. The framework aligns Canada's actions with that of the international community through COP21. The framework is based on four pillars including carbon pricing, carbon reductions, adaptation and economic development.

The Federal Government specifically introduced a mandatory floor price on carbon of \$10 per tonne CO₂ in 2018, rising to \$50 per tonne CO₂ in 2022. It will be imposed via either a carbon levy or cap-and-trade system. A price on carbon will be imposed on those provinces that either do not adopt a carbon pricing system or fail to meet this federal minimum price of carbon.

This approach to global climate action, focus on building a low-carbon, climate resilient economy. It will ensure that the provinces and territories have targeted federal funding and the flexibility to design their own carbon pricing policies and endow a \$2 billion Low Carbon Economy Trust to fund projects that reduce carbon.

⁶ <http://newclimateeconomy.report/>

In 2015-16, the **Government of Alberta** released the Climate Leadership Plan. This plan focuses on reducing GHG emissions and energy. Key elements of the plan are:

- Carbon Levy: \$20 per tonne CO₂ (2017), \$30 per tonne CO₂ (2018),
- Financial support for energy efficiency, infrastructure carbon reduction, and
- Phasing out emissions from coal-generated electricity and developing more renewable energy.

Further details of the levy were provided in June of 2016 with the approval of Bill 20 – the Climate Leadership Implementation Act. The purpose of the Act is to influence the choices of energy users by imposing a price on carbon. In addition, financial support will be provided for energy-efficiency measures, green infrastructure development and GHG emission reductions. The Province has established a new government agency called “Energy Efficiency Alberta” to design and implement energy efficiency programs for homes and businesses. Energy Efficiency Alberta programs are expected to be announced between April and May 2017, and include:

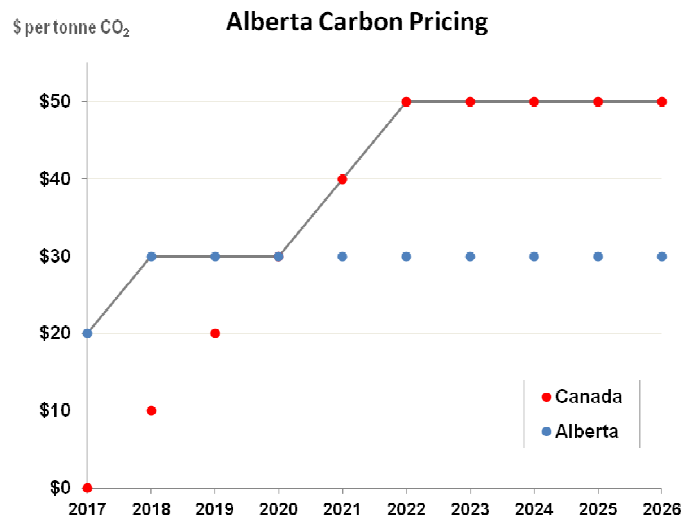
- **Residential Free Installation Program**
 - Approved contractors will install residential energy efficient products such as LED lighting, low-flow water fixtures and programmable thermostats. The installation is free to homeowners, and the contractors will bill directly to the Provincial government.
- **Residential Products Program**
 - Rebates will be applied at the point-of-purchase for efficient home appliances, efficient lighting products and insulation for homes.
- **Business, Non-Profit, and Institutional Rebate Program**
 - Incentives for high-efficiency retrofits of lighting, heating, cooling and hot water systems for businesses, non-profits and institutions.
- **Non-Profit Energy Efficiency Transition (NEET) Program**
 - Funding to help non-profit and volunteer groups determine how efficient their current lighting, heating, cooling and hot water systems are.

The City’s role to support citizens (eg. education), guide energy investment, use of carbon levy, to name a few, is still being clarified. Discussions are ongoing to explore the use of collaboration tables through the City Charter that could guide policy.

Alberta was a leader in 2003 by introducing the first Alberta Climate Change and Emissions Act which was followed in 2007 by the Specified Gas Emitters Regulation (SGER). It set a \$15 per tonne fee on emissions from large industrial emitters above target. The target was 12 per cent above original emissions. In 2016 this amount was increased to \$20 per tonne and \$30 per tonne in 2017. The target was increased to 15 per cent above original emissions.

The carbon levy on major fuels started on January 1st, 2017. The carbon levy will impact The City and citizens in numerous ways. While it will cause near-term increases in operational costs (\$6M in 2017), it will also provide targeted capital investment opportunities for Alberta municipalities and industry. In addition, it serves as a driver for increasing efficiency and subsequent longer-term lower operational costs. A recent report brought to Council (Report C2016-0795) provided further details on the corporate budget impacts from the Provincial and Federal carbon levy.

Carbon legislation will play an increasingly important role in investment and operational decisions for The City of Calgary. Based on current guidance from the federal and provincial governments, the expected compliance path for carbon pricing is shown in Figure 2.



3.2 COUNCIL AND CORPORATE DIRECTION

The City of Calgary has a long history demonstrating its commitment to addressing climate change from mitigation and adaptation to preparation and recovery from severe weather events.

- In 1994, Calgary was one of the first cities in Canada to participate in Partners for Climate Protection - a network of Canadian municipal governments committed to developing GHG reduction plans.
- In 2011, Council adopted the Calgary Community Greenhouse Gas Reduction Plan (UE2011-24) that outlined actions for The City and broader community to help meet targets both in the shorter and longer terms. As part of the plan Council also approved reduction targets of 20% below 2005 levels by 2020 and 80% below 2005 levels by 2050 - for both Corporate and community GHG emissions. Calgary is at risk of not meeting its city-wide targets.
- In 2013 June the largest flood since the early 1900s struck Calgary. A report from the Expert Management Panel on River Flood Mitigation (PFC2014-0512) provided key directions for flood mitigation and adaptation in our watershed. Calgary's Emergency Operations Centre was activated and played a key role in the management and recovery of the flood event.
- A Corporate Energy Management Plan has been developed to increase energy efficiency in City operations (2015/16).



In addition The City through Mayor Nenshi signed up for the Federation of Canadian Municipalities (FCM), “Big City Mayors Climate Change Action”. The commitment is to “stand alongside global efforts to avert the worst impacts of climate change” through

1. Support for binding GHG emissions reductions targets at the international, national and city level that address both short- and long-term commitments.
2. The development and implementation of municipal climate action plans that have specific actions designed to cut GHG emissions, identify the risks posed by climate change, and how those risks will be mitigated;
3. Regular reporting of municipal GHG emissions through the Carbon Disclosure Project, and a move towards standardized inventories and reporting to ensure greater accountability and transparency.”

Council’s Action Plan 2015 – 2018 provides further direction for actions to mitigate and adapt to climate change. Environmental and Safety Management is leading the following actions on behalf of the Corporation:

- H2.1 - Design and deliver programs to engage the community to advance the goal of reducing community greenhouse gases.
- H2.2 - Identify partnership and funding opportunities for energy efficiency and air quality-related initiatives throughout the community.
- H3.2 - Develop a comprehensive climate adaptation plan and implementation tools to reduce future impacts.
- H6.1 - Assume leadership role in educating and engaging the public to create awareness of links between energy consumption and GHGs, air quality, and climate change.
- H10.1 - Minimize the environmental impacts from City operations and capital projects; showcasing innovative and practical solutions to show leadership.
- H10.3 - Reduce GHG emissions from corporate sources to be an example for other corporations and municipalities.

Finally yet importantly, The City of Calgary and The City of Edmonton are working with the Government of Alberta to develop City Charters. Climate Change has been a specific focus of the Charter discussions under ‘energy and environment’. The Province is setting aside requirements for both mitigation and adaptation of climate change. It is not prescriptive on the details, but will require adaptation and mitigation planning as well as GHG reporting. The initial period for the Charter to be enacted was July 2017. Mitigation and adaptation to climate change is no longer just a City Corporate program, but will need to comply with provincial requirements.

4. A CHANGING CLIMATE

Climate change refers to a long-term shift in weather conditions and is projected to lead to both changes in average conditions and in extreme weather events with increases in droughts, heavy rains,

floods, and severe storms. Calgary's fall, winter and spring will be wetter, and summers will be drier. Figure 3 shows the future climate trends related to temperature and precipitation.

There is also evidence that the warming temperatures will be accompanied by a greater frequency of more severe weather events such as floods, droughts, hail, winter storms, tornados, and high winds—events that we can already see today. Low Carbon Emission (LCE) scenarios assume that drastic reductions of emissions in the coming decades will stabilize the concentration of GHG in the atmosphere by the end of this century. High Carbon Emission (HCE) assumes business-as-usual and that we will continue to emit large amounts of carbon dioxide from the burning of fossil fuels (Prairie Climate Centre, 2016).

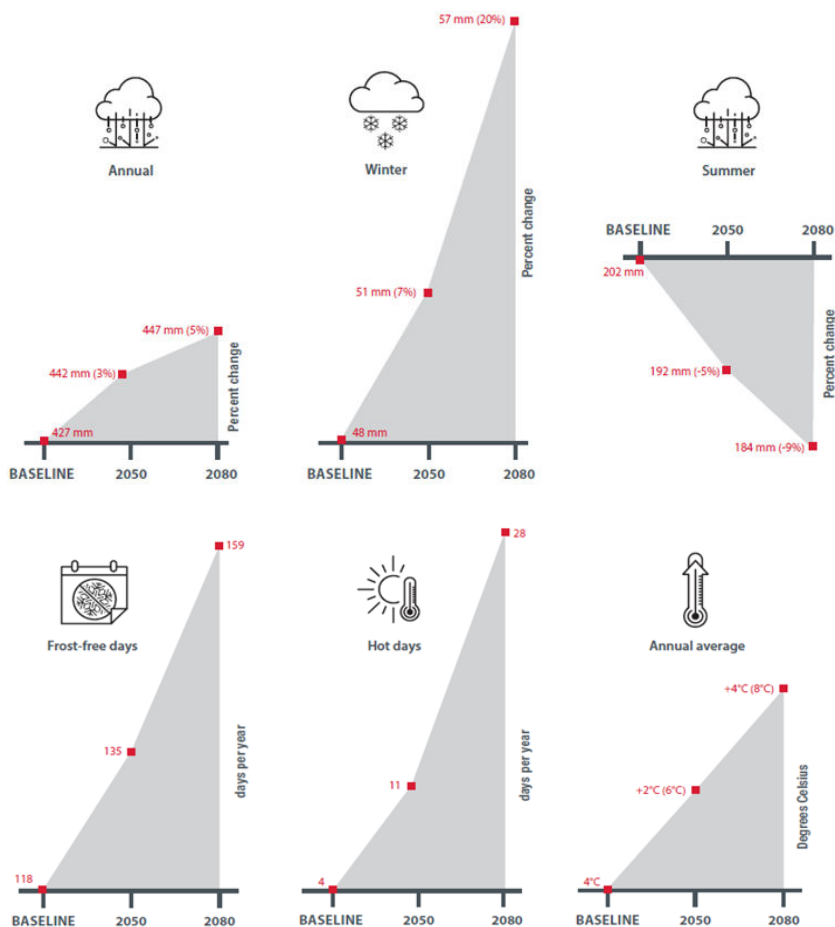


FIGURE 3 - FUTURE CLIMATE TRENDS

While there may be some opportunities for Calgary that come as a result of climate change, including longer growing seasons and less harsh winters, these will likely come with other variability and unknown extremes that are not currently accounted for such as pests and infestations.

Furthermore, these impacts have led to costly disasters in the past leading to Alberta and specifically Calgary getting the reputation for the costliest insurance payouts in Canada. Events like the 2013 Southern Alberta Flood, 2014 “Snowtember” and 2015 Hail Storm are examples of extreme weather events within Calgary. In fact, Calgary is the hail capital of North America. Models show that increasingly there will be a shorter return period between extreme events—that is, the estimated interval of time between occurrences will decrease.

5. THE CLIMATE PROGRAM

The Climate Program is the broad administrative umbrella that provides strategic oversight to climate related activities at The City. It is intended to increase The City’s capacity to protect against and respond to climatic changes in a co-ordinated and timely manner. It will guide The City’s compliance with current legislation, anticipated regulatory changes, and will build mitigation and adaptation considerations into existing and new plans, policies and projects. Increasingly, provincial and federal funding requires that The City demonstrate it has a comprehensive plan to address climate change or energy management, or to support the community in managing their impacts.

The Climate Program will use an approach that aligns with five key best practice areas in climate change planning for municipalities to ensure success (Figure 4). Each of these areas is described below.

- a. At The City both Council and ALT should be informed of the risks and opportunities related to climate change that will enable them to **lead** and make informed decisions. The Climate Program will, through research and communication and with corporate collaboration ensure that Council and ALT are updated on the most relevant information available. ALT has already directed Administration to coordinate climate change activities and Council, through Action Plan 2015 – 2018 directed Administration to act on Climate Change.

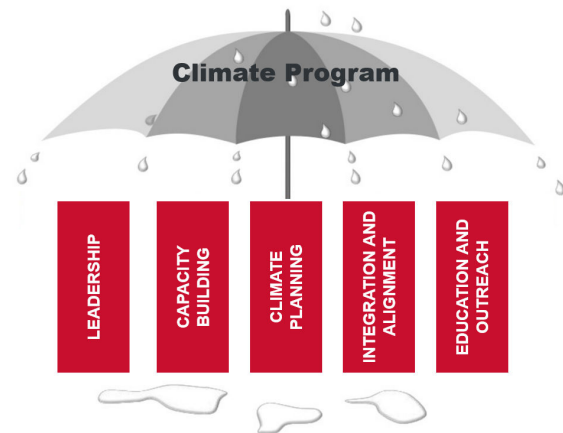


FIGURE 4 - CLIMATE PROGRAM APPROACH

- b. Municipalities have competing priorities that requires constant reprioritization to maximize resources and provide the services expected by the community. **Staff and financial capacity** should be developed to ensure analysis, evaluation and recommendations are made that considers the risks of climate change and carbon reductions. A risk evaluation process kicked off in 2016 that included over 180 subject matter experts and managers from all business units. Cross-corporate collaboration with Infrastructure Calgary, Finance, Corporate and Customer Service and business planners to name a few provides an opportunity to build capacity. Responsibility for action however lies with each business unit.

c. **Climate Resilience Plan** - Integrated long term planning provides strategic oversight to climate actions within The City and in the community. Best practices recommend that cities align their current planning processes with established targets and measures. “One City, One Voice” is key to alignment at The City. This means developing an agreement (strategy) with Administration that will enable Council to determine the most valuable investment with the resources we have to deliver services to Calgarians that will achieve Council’s vision for Calgary. The Climate Resilience Plan will include:

- A Strategy to guide decision-making for climate resiliency.
- Adaptation Plan identifying actions to reduce the impacts from the changing climate.
- Mitigation Plan to give direction on City and community carbon and energy management.
- Implementation Plan to coordinate actions of adaptation and mitigation

d. **Alignment** with various projects and processes including Connect 4, 100 Resilient Cities (100RC), City Charter and Legislative Change Strategy, to name a few, provides the legislative framework and opportunity to integrate climate resiliency into business planning and budgeting. Supporting external strategies through partner agencies such as Calgary Economic Development ensures broad alignment with economic initiatives.

Connect 4 will guide clear interaction between various plans, from long range to current plans. 100RC will provide broad oversight and guidance to all programs that build resiliency in social, economic and environmental spheres. Programs will then share and demonstrate the following characteristics:

1. Spare capacity – identifying and assigning spare capacity ensure that there is a back up or alternative available when a vital component of a system fails.
2. Flexibility - the ability to change, evolve, and adapt to alternative strategies in the face of disaster.
3. Limited or “safe” failure - prevents failures from rippling across systems.
4. Rapid rebound - the capacity to re-establish function, re-organize, and avoid long-term disruptions.
5. Constant learning - the ability to internalize past experiences linked with robust best practices.

In addition to the City Charter, the Legislative Change Strategy (LCS) presents an opportunity for The City to consider the implications of these new authorities (through the City Charter) for the organization and the citizens we serve. As a program, the LCS is focused on articulating a ‘state of readiness’ for authorities identified as key opportunities. It will assist in the state of readiness for the Climate Program (one of many) with benefits such as establishing roles and responsibilities, gauging organizational capacity and empowering teams to scope requirements for new authorities.

Building a strong relationship with community organizations and the ICI sector enables wide spread action with a shared responsibility. Low carbon economies require a transition plan. Calgary Economic Development has been investigating opportunities in green technologies and the

renewable energy sector that will attract investment and create jobs in Calgary. The Climate Program will work closely with Calgary Economic Development to ensure a level of readiness to support economic growth opportunities as it relates to climate change and carbon management through the development of a low carbon economy strategy.

- e. **Public awareness through education and public outreach** is a strong foundation for collaborative action. Public engagement and strong communications will be required to provide input into the development of a strategy that effectively coordinates the actions of both external and internal stakeholders. Research and targeted engagement will occur to better understand perceptions, identify opportunities for future engagement and develop appropriate communication tools.

5.1 CLIMATE RESILIENCE PLAN

The Climate Resilience Plan is the physical planning document that will include guiding principles, goals and objectives, measures and will provide the priorities and actions for business units, and opportunities for the industrial, commercial and institutional sectors and community to take collaborative action. The Climate Resilience Plan will consist of two main components – adaptation and mitigation.

Mitigation actions reduce GHG emissions in order to limit or reduce dangerous climate change. Mitigation actions can include energy efficiency and use of renewable. Adaptation actions are designed to respond to the impacts of climate change that is already occurring (and may get worse in the future). Adaptation is a risk management strategy and therefore essential to reduce the damages from climate change impacts that cannot be avoided.

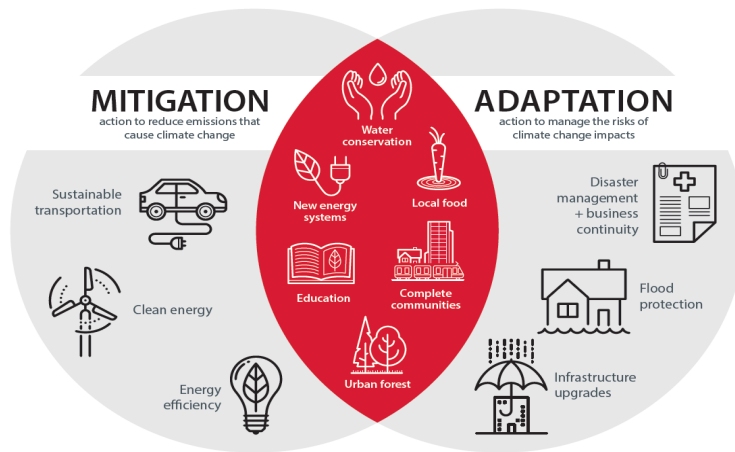


FIGURE 5 - MITIGATION AND ADAPTATION ACTIONS

As mentioned the Climate Resilience Plan will build on the existing efforts of the corporation related to climate change. These efforts will be closely coordinated with efforts from the Federal and Provincial Governments.

The City and citizens have already taken action to mitigate and adapt to climate change such as the 2013 Flood Recovery and “Snowtember” Re-Tree project as well as carbon reductions and subsequent return on investments in energy efficiency (such as the Street Light Retrofit Project) and investment in renewables (Southland Leisure Centre Solar PV). Some actions will have both mitigation and adaptation opportunities such as water conservation, urban forestry and education.

5.1.1 ADAPTATION

A number of adaptive measures have been applied by business units reacting to a changing climate – from the sustainable building policy to new bridge design, flood preparedness and emergency management planning to integrated watershed management. Preparation and recovery has been a main focus to ensure the safety of citizens and provision of services. The Calgary Emergency Management Agency (CEMA) and its partners play a significant role in the planning, response and recovery of severe weather events. CEMA's most recent Hazard Identification and Risk Assessment Report highlights the top five risks to Calgary as weather related.



Business Unit actions are often designed and executed in isolation instead capitalizing on the synergies and interrelatedness to have a process in place that analyzes systematically the climate impacts on our annual operating budget/costs, service delivery and economic, social and health system guides us to concerted effort.

An Adaptation Plan is currently being developed to address corporate climate vulnerabilities and risks. Cross-divisional climatic impacts and vulnerabilities are identified by seven thematic areas: 1) buildings, 2) emergency management, 3) people and communities, 4) transportation, 5) urban ecosystems, 6) urban planning and 7) water. The advantage of this cross-corporate initiative is that business leaders (SMEs, managers and directors) are involved in the identification and validation of risks as well as the design of adaptive action to minimize these risks and are feasible and practical for accountable business units and effective and targeted (use indicators for measurement and evaluation).

The high priority impact scenarios are being scored against environmental effects, infrastructure damage, human health and safety, community effects, response/ service disruption and legal/ regulatory scores to identify the risk severity. The current process involves over 180 staff at The City who contributes to the impact identification and risk assessment process. Recommendations on actions will assist business units to develop their actions in 2017.

The objective of Calgary's Climate Change Adaptation Plan is to anticipate and understand the range of potential adverse effects of climate change for Calgary, including vulnerabilities across all business units; develop appropriate actions to decrease vulnerabilities and minimize the risks of climate change impacts on The City's infrastructure, assets, natural, economic and social systems; and guide development of policies and programs to build resiliency into everyday operations and short and long-term investments.

Phase 1 (2016 June – 2016 December):

- Impact assessments – identifying and considering the impacts of current and future climatic events trending in the Calgary area
- Identifying corporate vulnerabilities in infrastructure, service provision, people and environment
- Risk assessment – identifying and aligning climate risks for the corporation.

Phase 2 (2017 January – 2017 December)

- Action identification and analysis – prioritizing and analysing the actions (and budgets) by each business unit

Phase 3 (2017 - 2022)

- Emerging Opportunities (due to risk level, project readiness and funding opportunity in 2017)
- Implementation – including the prioritized action into the BPBC process (2018 - 2019)

Phase 4 (2018 – 2022)

- Monitoring and Review (track implementation progress)
- Assess new information and review drivers
- Revise adaptation plan (2022)

5.1.2 MITIGATION

Calgary has a target to reduce city-wide GHG emissions to 20% below 2005 levels by 2020, and 80% below 2005 levels by 2050. Corporately The City generates 4% of the city-wide GHG emissions and while 96% of emissions come from the community. The 2011 **Community GHG Reduction Plan** provides strategies to address GHG emission reduction and energy efficiency through mitigation, and targets land-use planning, transportation, buildings and people including industrial, commercial and institutional sectors for both the community and corporation.

Existing actions do not put Calgary in a position to meet its current GHG reduction targets in the near and long term foreseeable future.

2015 community GHG emissions

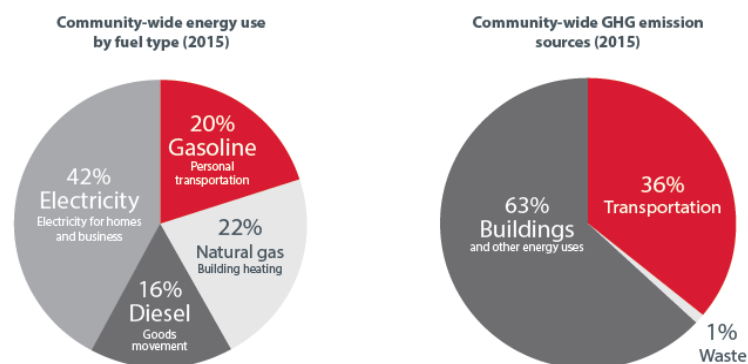


FIGURE 6 - 2015 COMMUNITY GHG EMISSIONS BY SOURCE

Absolute city-wide GHG emissions in Calgary have increased over the past 20 years. GHG emissions levels per capita however, have been relatively consistent since 2005 which suggests that the increase in Calgary's overall emissions is primarily due to the growth in population and subsequent energy consumption. Most of city-wide energy consumption (see figure 6) is from electricity (42%), due to a high reliance on coal-fired power plants in the province, natural gas used in buildings and industry (22%), and gasoline and diesel in vehicles and heavy-duty equipment (36%).

Energy is a significant, and growing, cost in Calgary. Research conducted by NRCAN found that Canadian cities, towns and villages have influence over approximately 60 percent of energy consumption and over half of all GHG emissions in Canada. Communities like Calgary consequently also have the potential to make significant contributions in addressing the current and future energy challenges of the city. Within The City of Calgary context, there are several points of influence and control, including urban form, buildings, transportation, waste, and distributed energy resources. Whereas air travel and vehicle standards, The City has little to no influence (figure 7). Focusing on the high influence and control activities can drive economic development, make communities more resilient to disruptions or changes in energy supply, and support key strategies for reducing greenhouse gas (GHG) and air pollution emissions. An example of where The City has used its control and influence is in transportation. The Transportation Department has developed plans and corresponding actions that will help mitigate transportation sector GHG emissions and improve energy efficiency, in many cases based on the strategic direction set out in the Calgary Transportation Plan (CTP) and include plans such as the RouteAhead, Cycling Strategy and Parking Policy.

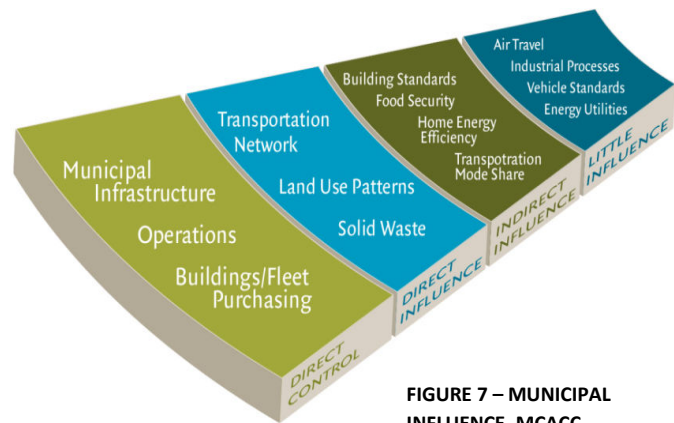


FIGURE 7 – MUNICIPAL INFLUENCE, MCACC

As mentioned **Corporate GHG emissions** account for approximately 4% of Calgary's overall GHG emissions. In the five years, from 2010 to 2014, The City's energy use grew in step with population, at around 3% annually. However, the resulting energy costs grew three times faster, at 9% annually. Looking at The City's energy use by activity, nine major energy functions have been identified. Figure 8 provides details by activity type. Of these activities, transit was the largest energy user in 2014, accounting for 34% of energy used in City operation, mostly due to the bus fleet's diesel use. Potable water production and wastewater treatment was the second largest use at 22%. Usage related to roads was third at 11%, mostly due to lighting. These activities also incurred the highest costs.

The recently established Corporate Energy Plan provides guidance for energy cost savings, energy efficiency and carbon reductions over the next ten years (ALT 2016-0334). The Corporate Energy Plan 2016-2026 provides a clear direction regarding corporate energy, and identifies opportunities for efficient energy use within The City's operations. The City of Calgary's energy use is set to grow by more than 3 per cent annually over the next decade. New services will add to the energy demand, with an increasing portion

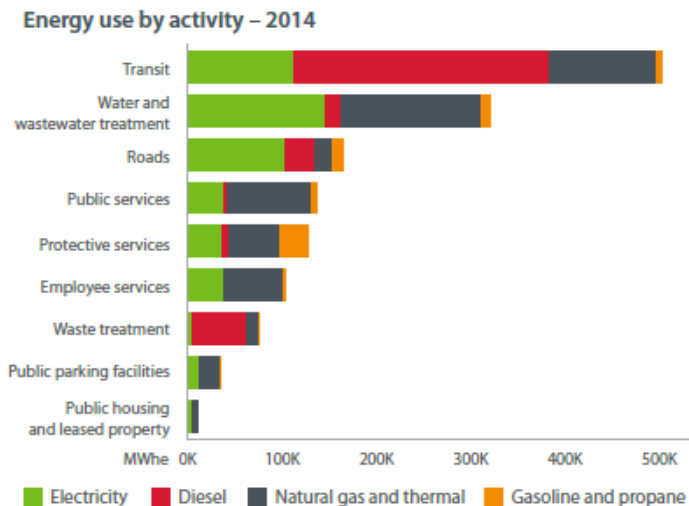


FIGURE 8 - CORPORATE ENERGY USE BY ACTIVITY

of The City's operating budget going to energy, and with greenhouse gas emissions rising. The Plan identifies 38 major opportunities for improved energy use along five themes. The analysis estimated \$340 million of potential energy savings between 2016 and 2026.

To track the results of energy actions, corporate energy performance will be measured using three factors:

- Corporate energy use per citizen, for effectiveness of energy use.
- Corporate energy costs as a percentage of The City's annual operating costs, for affordability of energy services.
- Corporate greenhouse gas emissions from energy, for accountability toward The City's environmental targets.

City business units are currently identifying the actions that they will focus on in the upcoming budget cycle and building their own energy actions plans.

In light of global economic changes, cost reductions, efficiencies and environmental protection, it would be important that The City develops its own strategy towards a low carbon economy, which builds on the Community GHG Reduction Plan approved in 2011 and ensures a readiness to comply with legislation.

Much has changed in the years since the plan was adopted in terms of political and economic context. The plan is a half-a-decade old, requires more detailed actions and an update led by Environmental and Safety Management will account for new policy direction. Rebranding of the plan to appropriately reflect the current reality will be required to ensure collaboration amongst all stakeholders. The objectives of a renewed carbon management plan include:

1. Lowering carbon emissions to 80% below 2005 levels by 2050
2. Increasing energy efficiency; and
3. Support the development of a diversified low carbon economy.

The technical development of the plan will be integrated with public outreach. The renewal of the plan will include:

- An update to the strategies and actions of the 2011 Community GHG Reduction Plan
- Coordinating carbon reduction efforts corporately and community wide
- Best practice research and recommendations to inform internal processes eg. the inclusion of energy planning in land use planning
- Supporting the implementation of the Corporate Energy Management Plan
- Collaboration with Calgary Economic Development (CED) and industry to support diversification in a low carbon economy.
- Alignment with Provincial and Federal direction

5.1.3 ENGAGEMENT, COMMUNICATION AND EDUCATION

During 2015, Calgarians and Edmontonians were engaged in surveys and focus groups about climate change. Survey results indicated that Calgarians want more information and leadership from The City. Nearly two thirds of Calgarians are concerned about global warming and the impacts of climate change. Calgarians also want the community at large to do more about climate change:

- 78 per cent feel that citizens should do more.
- 74 per cent feel that business and industry should do more.
- 69 per cent feel that The City should do more.

During December 2016, Environics Research conducted six focus groups with Calgary residents regarding their perceptions of the City of Calgary's efforts to mitigate and adapt to impacts related to climate change. All of these sessions included a mixture of people from different socio-economic backgrounds and a range of perceptions of seriousness of climate change and the extent to which they are taking action to address the issue. Results included the following:

- Virtually all participants – including those who are highly skeptical about efforts to reduce greenhouse gas emissions – acknowledged that climate change is taking place, and that it is having an impact on Calgary.
- The vast majority of participants – even opponents – indicated that they do take steps in their personal lives to reduce their carbon footprint. Most of these behaviours were related to household energy consumption or transportation.
- Calgarians appreciate a message of 'leadership', which spoke to Calgary's can-do attitude, especially where Calgary could lead on a low-carbon economy.
- The City is generally trusted and seen to be doing a lot already. The City should address the effects of climate change and focus on local and practical solutions.
- Non-governmental organizations and third parties should participate in messages about climate resilience and asked for more education.

Building climate resilience takes effort of the whole community. Direct GHG emissions for the wider community of Calgary are 96% while City of Calgary Corporate emissions are 4% of the total emissions. The Corporation has influence (but not direct control) over more than 60% of all activities. Recognizing and building on existing work in the community will provide a cornerstone in developing partnerships in climate resiliency. In June 2016, Alberta EcoTrust convened 41 organizations and businesses to identify cross-cutting climate change projects in Calgary. These organizations identified 89 of their own activities or projects and also identified an additional 63 organizations taking action on climate change, but not represented. Water, transportation, energy use in buildings, industrial energy use, education, leadership, resilience and advocacy are but a few of the cross-cutting projects and activities.

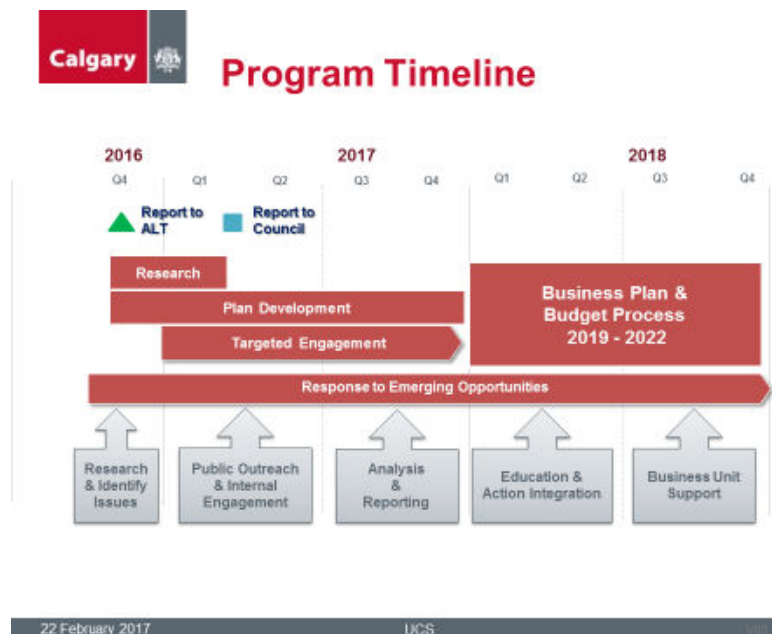
Several other organizations, such as ENMAX and TelusSPARK, have for instance delivered education programs related to energy efficiency and renewables. Organizations such as Calgary Home Builders Association (CHBA) have advocated and implemented energy efficiency and renewable energy programs into residential construction. Research however shows that Calgarians have a low literacy rate related to climate change, energy and possible solutions. It indicates an opportunity for collaboration to educate and inform Calgarians with industry. The Provincial Government has indicated through various processes, including the City Charter and Energy Efficiency Panel, that education will play a significant role in their plan.

5.1.4 PLAN DEVELOPMENT TIMELINE

The program timeline (Figure 9) indicates the start and end periods for each of the deliverables. The Climate Resilience Plan will be developed through research input and internal and external engagement to prepare actions for the 2019 – 2022 business planning process. While this is underway administration will capitalize on emerging opportunities such as funding for capital projects through the carbon levy or alignment with energy efficiency announcements done by the province.

A consultative stakeholder focussed approach will inform the integrated plan. The grey arrows indicate the education and outreach components to build the plan.

- During 2016 the research and issues identification phase will provide information on what we need to know and what we don't know.



- During Q1/2 2017 public outreach will use a targeted engagement approach and focus on expert, ICI and community leadership advice.
- Recruitment and engagement will take the form of panel deliberations to inform us on what to do in 2018, where we will refine input through broad engagement in the business planning engagement process.

The short timeline for the Climate Program development is driven by three variables:

1. Readiness to respond to external funding: Developing projects that enable The City to respond and to capitalize on early grant programs. Each year the Province and Federal Government release grants and funding. The City stands to lose out if no plans/proposals are available to be submitted for consideration. A level of readiness would be required to respond to such emerging opportunities.
2. Impacts of the Carbon Levy: Increased Corporate and community (including ICI) opportunities and operational impacts. Reducing impacts and capitalizing on opportunities early on will ensure cost savings and utilization of carbon funds (from Provincial and Federal Governments) to be made available from the carbon levy program.
3. Business Plan and Budget Cycle (BPBC) process: This process starts in 2018 to prepare for the BPBC 2019–2022 and Administration should be ready to include actions in this process.

6. THE PATH FORWARD

To be successful, implementation should be coordinated across The Corporation and guided throughout the community. All operations and lines of services share in the response in some way, and community members are invited to collaborate and take action. Coordination and implementation will consolidate actions for the 2019-2022 business cycle and beyond. Activities for 2017 will include:

- Development of an adaptation plan.
- Development of an updated GHG reduction and energy plan.
- Development of actions for each business unit to respond to the identified climate risks.
- Development of finance models for corporate carbon reduction and energy efficiency initiatives.
- Alignment with City strategies such as 100 Resilient Cities as well as business processes such as “Connect 4” for effective business planning and budgeting.
- Prioritize actions by business unit in preparation for the next business cycle.
- Tactical oversight on climate actions including education, engagement and communication.
- Coordinated response of City plans and actions to changes in the climate and greenhouse gas emission reductions.
- Incorporation of legislative and regulatory direction through the City Charter.
- Coordinated response to provincial and federal climate related funding.

Actions identified in the existing business cycle (2015 – 2018) or identified as high level risks and/or as opportunities or challenges presented by the Provincial and Federal Government, are identified as



emerging opportunities. These opportunities to reduce The City's immediate risk exposure and to capitalize on funding/granting opportunities include:

- Implementation of the Corporate Energy Management Plan (2017 Q2)
- Internal coordination to include carbon reductions and adaptive measures (2017 Q2)
- Electric Vehicle Strategy (Charging Stations and EV-Ready Development) (2017 Q2)
- Prioritizing low carbon actions in the economy (2017 Q2)
- Coordinated targeted engagement (2017 Q2)
- Energy efficiency planning for the industrial, commercial and industrial sectors (2017 Q3)