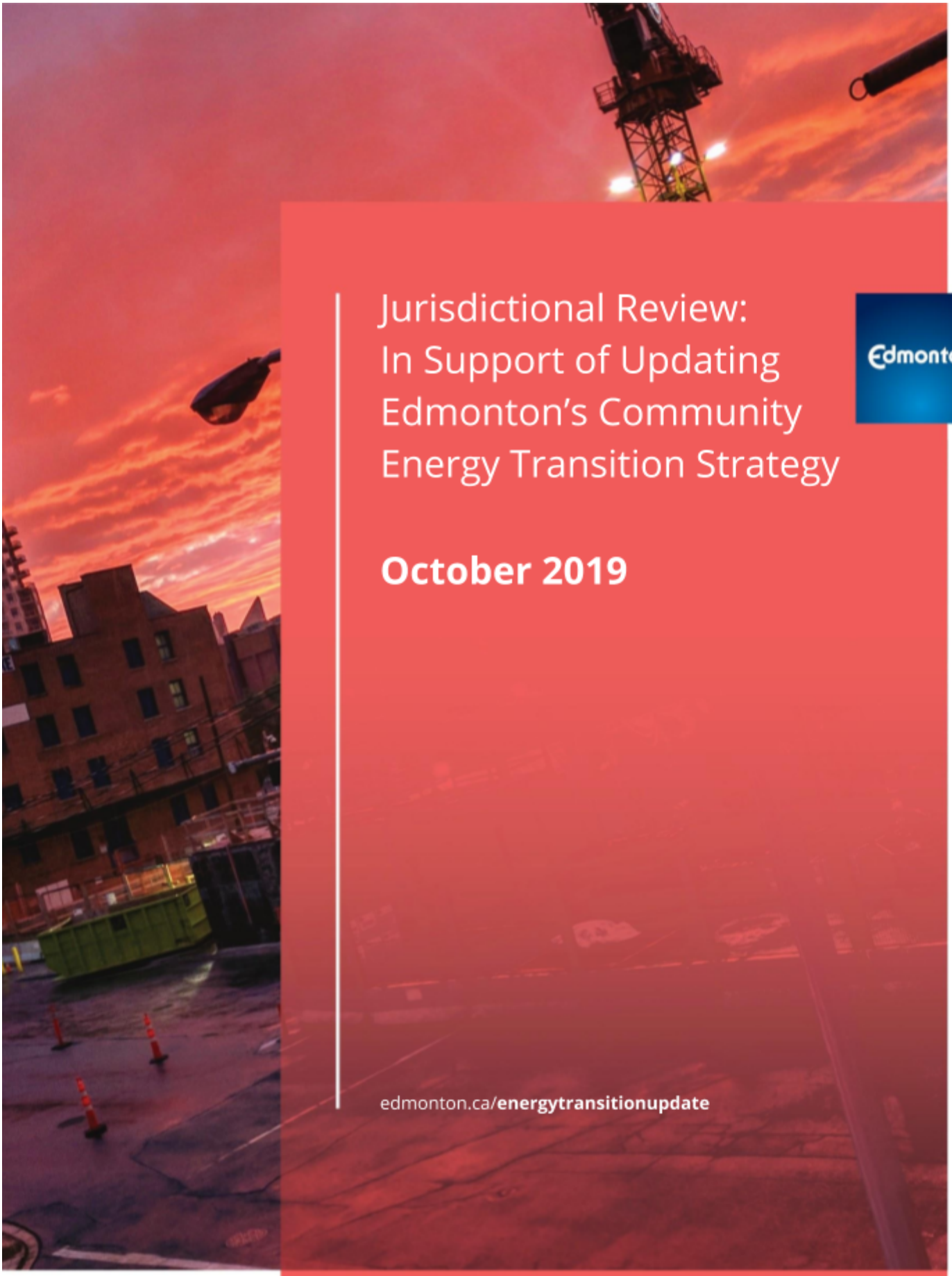

Jurisdictional Review: In Support of Updating Edmonton's Community Energy Transition Strategy

October 2019

edmonton.ca/**energytransitionupdate**

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Background

Edmonton's Community Energy Transition Strategy is the backbone of Edmonton's plans to reduce its greenhouse gas emissions. As part of the work to align the Strategy with the Edmonton Declaration, a review has been completed of the emissions reduction work being done by other municipalities around the world. This review ensures we consider and assess the potential of a broad set of greenhouse gas emissions mitigation actions that could be deployed in Edmonton.

Sources Consulted

The Environmental Scan was completed in September 2019, and consisted of four components:

1. A review and analysis of actions taken or proposed in the following Canadian cities: Vancouver, Toronto, Montreal, Calgary, London, Winnipeg, and Saskatoon.
2. A review and analysis of the actions reported to the CDP (Carbon Disclosure Project) as being taken by cities in 2018.
3. A review of the Climate Change Mitigation Plans, and in-depth analysis of key actions being taken by the following global municipal climate leaders: New York City, Paris, Oslo.
4. A review of key actions being taken by other cities that have been recently proposed for Edmonton, and with which administration is less familiar.

Benefits

The completion of this scan provides Edmonton's City administration with several benefits.

Firstly, it provides a broad "menu" of actions to consider for implementation in Edmonton. In the context of the Climate Emergency declared by City Council on August 27th, it is vital that Edmonton consider as broad a range of potential solutions as possible. The options deployed by other cities around the world may be quite different from approaches Edmontonians naturally gravitate to. They may also be outside of City Administration's traditional comfort zone or experience. However, taking the time to review them, noting their anticipated GHG reduction impact, and in some cases reviewing their success to-date, ensures that Edmonton takes advantage of the learnings of others in order to make Edmonton's Strategy as likely to succeed as possible.

Secondly, it allows Edmonton's City Administration an opportunity to consider aspects of actions that make them more or less likely to succeed in any particular location. Geographic, political, and availability of natural resources for example can all significantly impact whether an action will succeed in a particular city.

And finally, it provides insight into where in the world there is specific expertise we may want to draw upon, and where the skills and experience we have in Edmonton represent opportunities for economic development and trade.

Purpose

The information gathered in this environmental scan may be used by all team members in developing engagement activities, exploring funding alternatives, and updating the Community Energy Transition Strategy itself. It will also be integrated into documents shared with other parts of City Administration to provide context, details, examples of successes and challenges.

Outcomes

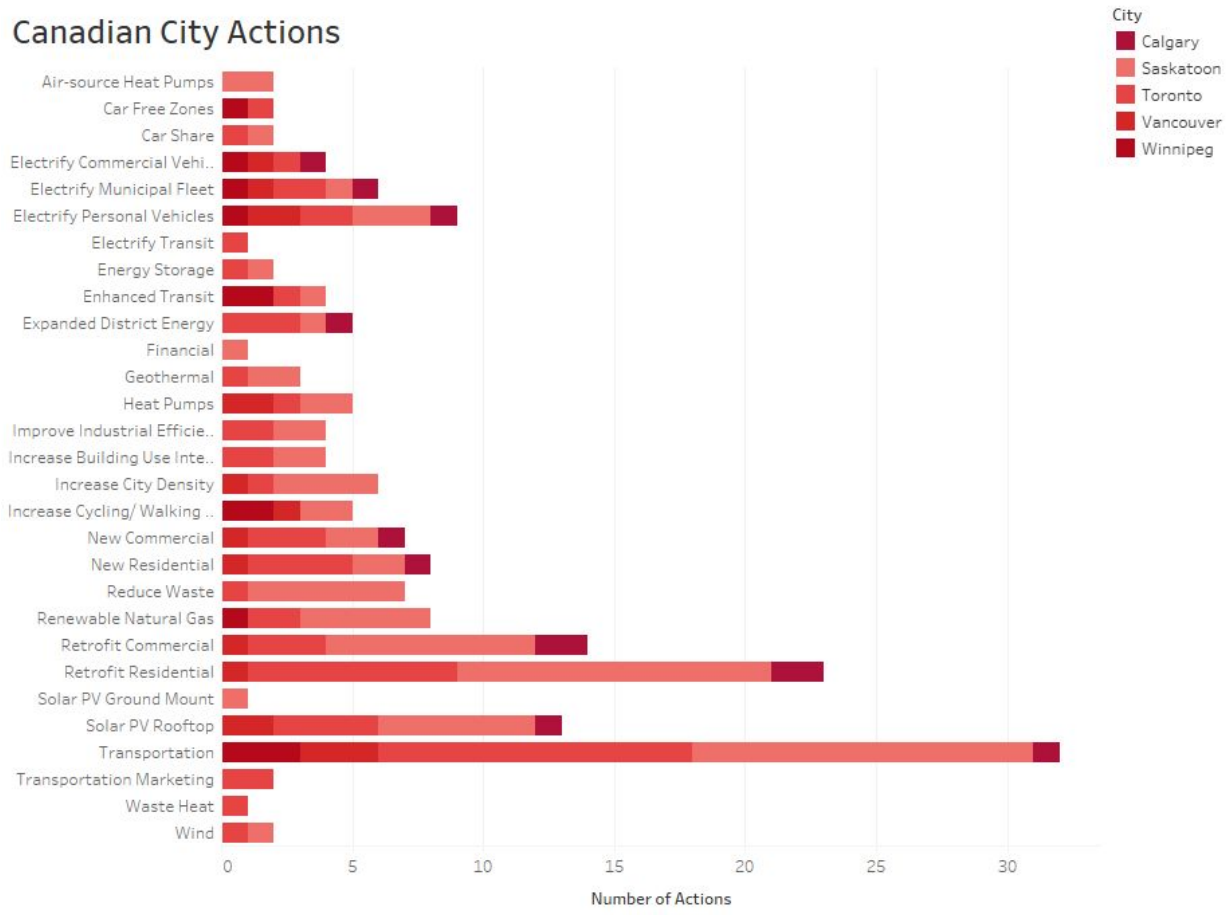
The outcomes of this environmental scan have been analyzed and compared to the 24 actions that make up the city's proposed six climate shifts, which are shown below.

Climate Shift	Action
1: Tools and Targets	Carbon Budget
2: Low Carbon City and Zero Emissions Transportation	Intensify Building Use Intensify Land Use Establish Car Free Zones Establish Car Share Programs Implement Transportation Marketing Electrify Personal Vehicles Electrify Commercial Vehicles Electrify Municipal Fleet Electrify Transit Enhance Transit Services Increase Cycling & Walking Infrastructure
3: Emissions Neutral Buildings	Improve Industry Efficiency Install of Heat Pumps Achieve Net Zero in New Residential Buildings Achieve Net Zero in New Commercial Buildings Retrofit Residential Buildings Retrofit Commercial Buildings
4: Renewable Revolution	Establish Renewable District Energy Systems Switch to Renewable Natural Gas Install Solar PV Systems Acquire Wind Power Install Renewable Energy Storage Decrease Waste Generation
5: Just and Equitable Transition	*All actions must be implemented in a way that ensures all members of our community are able to transition to a low carbon lifestyle successfully.*
6: Negative Emissions	Enhance Urban Forest Implement Carbon Sequestration Technologies

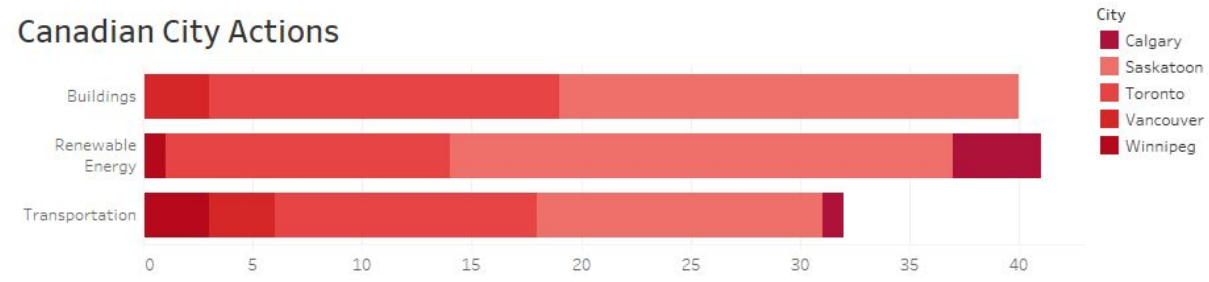
Comparisons were drawn firstly with the surveyed Canadian cities and then with surveyed cities outside Canada. Trends, outliers and unique approaches among cities have been noted and compared with Edmonton's proposed actions. Note that Appendix A: Global Municipal Climate Mitigation Actions contains all of the actions reviewed as part of the Environmental Scan.

Canadian Municipal Climate Change Mitigation Actions

The following identifies the types and number of actions being taken in the Canadian cities surveyed:



The actions adopted across Canada are largely consistent with the suite of actions Edmonton is proposing to pursue with its climate shifts. If the actions are grouped into categories as shown below, it becomes apparent that the majority of actions being undertaken in these Canadian cities are in three areas: buildings, renewable energy and transportation.



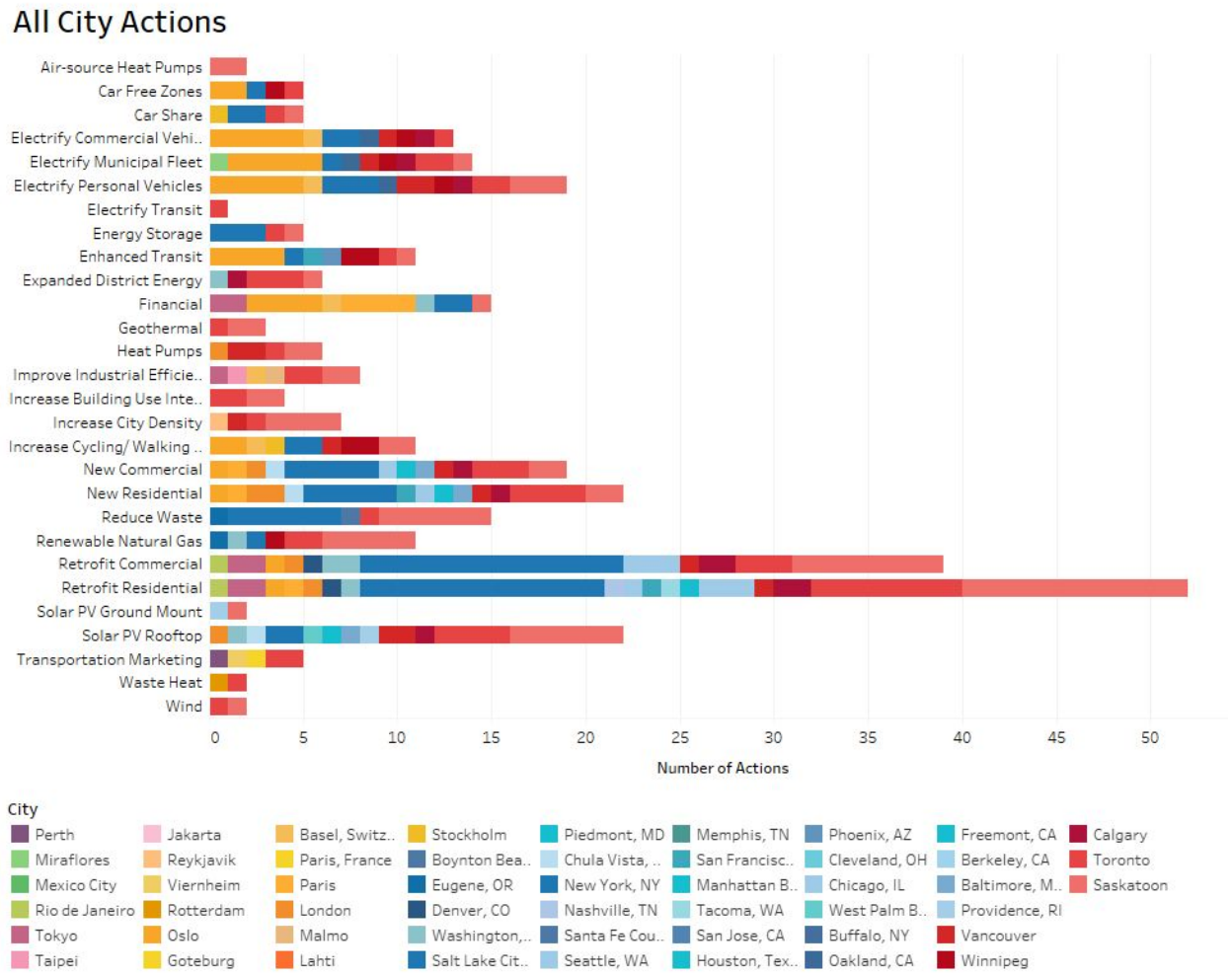
This is understandable considering Canadian cities' northern climates, historic dependence on fossil fuels, and large, geographical footprints that require extensive transportation. The focus on buildings and transportation is also aligned with the C40's recommendation to focus particularly between 2016 and 2020 on these two sectors in order to make the biggest impact on greenhouse gas emissions as quickly as possible.

In 2018, approximately 37% of Edmonton's emissions (6.9 Mtonnes) came from heating and electricity use in residential, commercial, and institutional buildings. A further 20% (or 3.7 Mtonnes) came from transportation fuel. Accordingly, 13 of the initial 24 proposed actions that make up Edmonton's proposed climate shifts are directed at reducing emissions from buildings and transportation. If carried out as proposed (and in conjunction with other related actions), together they will accomplish a 34% reduction in Edmonton's emissions.

Edmonton's proposed climate shifts also focus on renewable energy, with eleven of the initial proposed actions aimed at rapid changes away from fossil fuels and onto renewables. It should be noted that like many other cities, Edmonton's proposed actions include shifting to a greater reliance on electricity. In cities with electricity that is produced from renewable energy sources this will reduce these emissions relatively quickly. In Alberta however, electricity is still not "greener" than some other fuels. As a result, the speed and extent to which shifting to electricity results in reduced emissions is dependent on how much and how quickly the provincial grid is decarbonized.

World-wide Municipal Climate Change Mitigation Actions

The following chart groups all of the actions surveyed in cities world-wide:

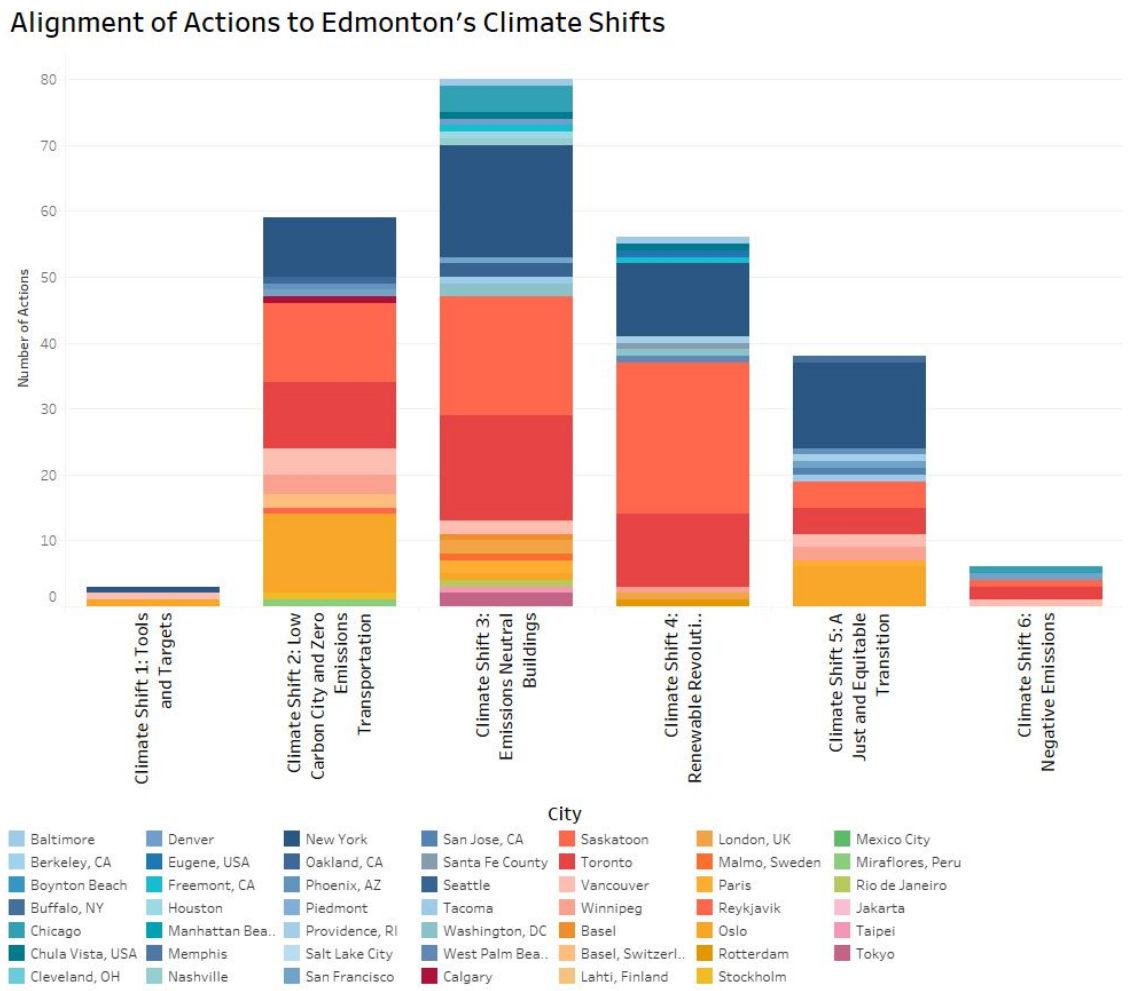


As in Canadian cities there is an emphasis on actions relating to buildings, transportation and renewable energy sources. However there are also differences.

For example, neither renewable natural gas nor reducing waste appear in climate action plans outside of North America. The absence of waste reduction from climate action plans may be indicative of the fact that cities outside North America have already reduced their waste significantly due to space restrictions, and so are not focusing on this in the context of reducing greenhouse gas emissions. Similarly, although expanding renewable district energy systems is a focus in Canada, it does not appear from other cities' climate action plans that they have a similar focus. However in many European countries such as Latvia and Denmark, district energy has been common (and in the case of Denmark, required by law) since the 1970s oil crisis or earlier. The absence of these actions from international municipalities' climate action plans therefore should not necessarily cause us to question their validity in the context of Edmonton.

World-wide Alignment with Edmonton's Climate Shifts

The following demonstrates how the actions being taken by other cities align with Edmonton's climate shifts:



Conclusions & Recommendations

The measures modelled in the illustrative pathway and the existing actions in the current Community Energy Transition Strategy are, at a high level, aligned with those of other world cities. However, the following are actions identified during the survey that stood out, and that should be reviewed in more detail and as the Community Energy Transition Strategy is updated in Edmonton:

Climate Shift 1: Tools and Targets:

Most cities with climate change action plans are also already setting targets for emissions reduction. The following approaches however stood out:

- Oslo's "Climate Budget 2018" is regarded by many as the most advanced municipal "climate budget" in the world. Edmonton should review Oslo's approach to carbon accounting and its integration into both corporate and city-wide decision-making, and incorporate components of it as appropriate.
- Vancouver's "Climate Emergency Response" contains elements of corporate carbon budgeting that reflect the Canadian political context. Edmonton should review their approach to carbon accounting and incorporate components of it as appropriate.
- New York is currently assessing ways in which completing a consumption-based inventory can complement their current GHG inventory, and their plan to reduce their greenhouse gas emissions. This confirms Edmonton's plan to incorporate lessons learned from having completed a consumption-based inventory in 2018, into the Community Energy Transition Strategy.

Climate Shift 2: Low Carbon City and Zero Emissions Transportation

Within this climate shift, many cities are implementing actions similar to those being implemented or considered by Edmonton. This includes expanding transit and encouraging the electrification of vehicles of all types. Densification of buildings, and decreasing the average citizen's household and work space are also approaches that appear in most of the climate plans reviewed. In addition to these trends, the following actions stood out either because they are not part of Edmonton's current climate mitigation actions or because they are unique or more prevalent than expected:

- Reykjavik has established a fixed city boundary, within which 90% of all new residential units must be built. Other cities with urban growth boundaries include Boulder (Colorado), Portland (Oregon), and Seattle (Washington)[1]
- Oslo is implementing a suite of actions to discourage fossil fuel vehicles, including:
    - Toll/ congestion charges are issued only to drivers of fossil fuel vehicles as they enter the city; 95% of these funds go directly to increasing active transportation network and transit; base the amount of the toll on the time and environment;
    - Parking charges only apply to fossil fuel vehicles throughout the city;
    - Electric vehicles are permitted to drive in bus lanes;
    - Lower national taxes are charged to electric vehicle owners;
    - Parking spaces overall have been reduced in the city;
    - All private vehicles (both electric and fossil fuel) have been banned from the city centre.
- Bike networks are being dramatically expanded in Oslo, Stockholm, New York (1600 miles of bike network in 2016, adding a further 50 new miles / year), Phoenix, Basel (Switzerland), Saskatoon, Winnipeg (800km), Vancouver, and other locations.
- Car free zones have been installed or are planned for Winnipeg, Toronto, New York, Oslo and other cities. This action is appealing because the cost to create them is low, it can be done

[1] https://en.wikipedia.org/wiki/Urban_growth_boundary, viewed October 7, 2019.

quickly, it reduces vehicle emissions effectively, and it's often associated with neighbourhood rejuvenation.
- San Francisco provides transit passes to residents and businesses in all newly developed areas of the city, and to all hotel patrons.

Climate Shift 3: Emissions Neutral Buildings

Across the cities surveyed, increasing the energy efficiency standards for both new and old buildings was a common theme. In the case of retrofits, property assessed clean energy (PACE programs are common particularly in the US. Often, a number of actions were being deployed to ensure that different sectors were incentivized appropriately, and that under-privileged neighbourhoods were not left behind. The following examples stood out:

- The use of natural gas is being reduced or eliminated across many cities. For example, in areas of Toronto not served by district energy, natural gas heating is being replaced with air source heat pumps. In Seattle and Berkeley, regulations are in place or being drafted to require that natural gas lines *not* be installed in new constructions.
- Saskatoon is introducing both electric and thermal energy consumption caps in coordination with step code for new residential buildings. They are also initially incentivizing, and later mandating both homeowners and owners of industrial, commercial and institutional buildings to complete deep energy retrofits.
- Seattle offers additional height and floor area incentives to major renovations in the city centre that reduce their energy and water use well below code and do not use fossil fuels for heating.
- Tokyo is launching the world's first urban cap and trade emissions program for 1400 large facilities in the city.

Climate Shift 4: Renewable Revolution

Before reviewing cities' actions to promote renewable energy, it should be noted that in many countries energy procurement is controlled by the federal government. Cities in these regions may have less ability to encourage a transition to renewables.

The types of renewable energy that different cities turn to depends to some extent on which sources are most readily available at each location. Many cities are also more actively seeking to use waste products for fuel, whether through anaerobic digestion of organic waste and wastewater or the creation of wood pellets to be used in stoves. In this area, the following actions were noteworthy:

- The port city of Rotterdam in the Netherlands is making its greenhouse industry energy neutral by connecting the buildings to sources of waste heat from industry. It's also going beyond this to connect a total of 50,000 buildings to the same industrial waste heat.
- In Washington, D.C. the Renewable Energy Portfolio Standard (RPS) requires that electricity suppliers source 50% of their electricity from solar PV or solar thermal installations by 2032. 5% of this must be local.
- Washington, D.C. is also embracing some less common approaches, including:
    - By 2032, the power bills of at least 100,000 of the district's lowest income households must be reduced by at least 50% through solar power.
    - Providing net metering to residential and commercial customers who have generators powered by renewable energy sources including CHPs, fuel cells and microturbines.
    - Passing legislation to allow residents and businesses who cannot install solar PV panels on their own roofs to use a "virtual" net metering program to purchase solar energy from systems installed elsewhere in the city.

- In Freemont, CA, 100% of new residential developments must include solar systems of a certain capacity based on the square footage or electricity required by the building.

Climate Shift 5: Just and Equitable Transition

The following are noteworthy actions that included elements that ensure all members of the community - including the less affluent, or those who previously worked in the fossil fuel industry - can transition to a low carbon future:

- New York City has numerous initiatives that pair trades schools with programs to retrofit buildings, and install renewable energy systems and energy storage. The City also partners with building material manufacturers, unions and trade organizations to ensure that local business can provide the required materials, and that a local, skilled workforce is developed while the work to reduce emissions is being completed.
- The San Jose Clean Energy Program allows citizens, businesses and government users to pool their electricity demands and bulk purchase renewable power on their behalf.
- Paris, France has a target to reduce energy consumption by 35% in all social housing by 2030, and by 50% by 2050. The City finances the renovation of 4,500 housing units per year such that they reach an established “low consumption standard”. From 2018 onwards, the renovations will accomplish 60% energy savings; and from 2020 onwards the number of housing units retrofit each year will be increased to 5,000.
- Buffalo, NY launched and is supporting the development of the largest solar panel production facility in the western hemisphere, creating 5,000 jobs in the state.

Climate Shift 6: Negative Emissions

Cities are just beginning to address the fact that in addition to reducing emissions, a significant amount of greenhouse gases will still need to be removed from the atmosphere in order to avoid having the average global temperature rise more than 1.5 degrees. The following municipal actions in this area were noteworthy:

- Chicago has had a green roof initiative underway for a number of years. Through it, they intend to establish 6,000 rooftop gardens and plant more than a million new trees in the city by 2020.
- Toronto’s plans include expanding the city’s tree canopy cover to 40%, achieving equitable distribution of canopy cover and increasing biodiversity. It is also continuing its Eco Roof Incentive Program which began in 2009, and has transformed over 6 million square feet of space.
- Paris has launched a program to create an urban forest alongside four of its historic sites. This is part of a wider goal to make 50% of the city’s surfaces vegetated and permeable.

Appendix A: List of Climate Plan Actions from Cities Surveyed

Provided under separate cover.