
Inquiry – Councillor M. Loewen (October 11, 2011) Climate Adaptation Strategy

Recommendation

That the report of the General Manager, Corporate Performance Department dated September 14, 2015, be forwarded to City Council for information.

Topic and Purpose

This report responds to an inquiry made by Councillor Loewen regarding climate adaptation planning in Toronto and options for developing an adaptation strategy for Saskatoon.

Report Highlights

1. Climate change implications including rising temperatures, changed patterns of precipitation, and more extreme weather events have been observed and predicted for the Saskatoon Region.
2. The City of Toronto is among many cities planning for adaptation to climate change and a number of tools and resources have been developed to help municipalities become more resilient to climate change impacts.
3. The Administration currently reports on the environmental implications of initiatives and will develop additional reporting tools to identify resiliency to climate change impacts.
4. Some climate impact assessments have begun; however, comprehensive climate adaptation planning has not.

Strategic Goals

This report supports a number of four-year priorities and long-term strategies related to the Strategic Goal of Environmental Leadership. Specifically, to consider mitigation strategies for the impact of severe weather events on the City of Saskatoon's (City) infrastructure.

Background

On October 11, 2011, Councillor M. Loewen made the following inquiry:

“Would the Administration please report back to Council with options for an adaptation strategy that ensures Saskatoon's infrastructure and budget can respond adequately to the challenges of climate change? The City of Toronto's 2008 report, “Ahead of the Storm: Preparing Toronto for Climate Change,” may be used as a guide and the Administration's report should consider options like risk assessment of vulnerable infrastructure, reduction of possible flooding risks, increased parks naturalization and the possible establishment of an extreme weather reserve.”

Report

Climate Change Implications

The City of Toronto report, “Ahead of the Storm: Preparing Toronto for Climate Change” outlines the various projected climate change implications for that region and what they mean for Toronto. Climate change implications are described in more detail, including what is expected for the Saskatoon region, in Attachment 1.

Preparing for Climate Change

The impacts of climate change are largely experienced at the community level and include public health implications, water supply and storm water issues, transportation system disruptions, power disruptions, impacts to public and private properties and landscapes, and increased and/or urgent demand for social and emergency services.

The goal of preparations for climate change is to achieve greater resilience such that people, neighbourhoods, businesses, and organizations are able to cope with current climate variability as well as adapt to future climate change, preserving the quality of life achieved through current development, and minimizing damages.

City of Saskatoon – Mitigating Risks of Climate Change

The City of Saskatoon has been focussing on the mitigation of key risks through an Enterprise Risk Management approach. One risk that has been identified is that the City may be lacking a clearly articulated strategy on how to manage climate change related risks. The following current initiatives respond to this identified risk and are expected to improve the City’s adaptability to climate change impacts:

- Improved alert systems including use of Service Alerts and NotifyNow.
- Creation of an Emergency Measures Organization (EMO) office that works with civic and key community stakeholders on weather response planning.
- Completion of a study of the capacity of storm water sewer system and initiation of storm water management planning based on study results.
- Creation of a new Storm Water Utility to generate sustainable funding for infrastructure required to protect against flooding in the community.
- Increased capacity for the storage of drinking water.
- Increased sewage treatment capacity to ensure the system continues to function in wet weather conditions without spilling to the river.
- Improved weather response plans for the urban forest.
- Introduction of the Wetlands Policy to increase the use and functionality of natural or naturalized areas as ‘green infrastructure’.
- Planning for improved transit and multi-modal transportation systems through Growing Forward.
- Enhanced power backup systems to support critical communications infrastructure.

Other Municipalities

Municipalities are increasingly focussing attention and resources on preparing for climate change to ensure that the services and infrastructure they are responsible for are protected and that prudent planning of future investments considers service resiliency. Attachment 2 provides more information about climate adaptation efforts, including providing a snap-shot of current efforts by the City of Saskatoon to mitigate for the risks created by climate change.

Options for Adaptation Strategy

The inquiry requested options for an adaptation strategy for Saskatoon to ensure our infrastructure and budget can respond adequately to the challenges of climate change. The following are some options for consideration:

1. Continue current efforts, though piece-meal, to develop an understanding of climate change implications for each Service Line and identify initiatives to mitigate or adapt for these impacts through annual business planning efforts;
2. Reach out to the Universities of Saskatchewan and Regina, along with other experts, to determine whether Saskatoon could be used as a case study in comprehensive adaptation planning;
3. Implement a comprehensive planning effort similar to the City of Toronto by establishing the capital funding necessary to complete this work. The scale of the planning effort could be expected to be comparable to the Growing Forward initiative in terms of time and resource commitment.

Public and/or Stakeholder Involvement

A number of plans to address climate change risks are already underway and plans for increasing the awareness civic staff have about resiliency to climate change impacts are being developed by Environmental and Corporate Initiatives.

Most divisions have a role to play in comprehensive climate adaptation planning for Saskatoon, in particular: Facilities and Fleet Management, Finance, Fire and Protective Services Department, Parks, Planning and Development, Public Works, Recreation and Community Development, Saskatoon Land, Saskatoon Light & Power, Saskatoon Transit, Saskatoon Water, and Transportation will be engaged through the business planning process to identify adaptation initiatives.

Expertise from outside the corporation is regularly sought and members of the Administration actively participate in knowledge networks in order to engage and leverage innovation and expertise where available. In particular, a number of Centres of Excellence under the Canada Research Chairs program have been established at the University of Saskatchewan, providing excellent resources to Saskatoon.

Financial Implications

The City of Toronto noted significant budget pressures and over-expenditures of more than \$10 million had already been experienced at the time of their report and the creation of an Extreme Weather Reserve was recommended. Saskatoon has a Major

Natural Event Reserve established to assist in offsetting operational and capital expenditures required due to a major natural event such as blizzards, plough winds/tornado, heat wave, severe rain, river flood event, or extreme cold. This reserve is currently unfunded and has been capped at \$250,000. The City has also created a Snow and Ice Management Contingency Reserve to offset over-expenditures related to winter weather. This reserve has a cap equal to the value of the Snow Clearing/Removal program and has a current balance of \$977,000.

No financial implications have been identified specific to comprehensive climate adaptation planning in Saskatoon at this time. It may be noted; however, that the City of Toronto implemented climate adaptation planning work by engaging a full-time staff person, allocating funds for vulnerability and risk assessments, and mandating five civic divisions to work collaboratively up to one day a week on inter-departmental initiatives. The City also leveraged external program funding assistance for the development of their comprehensive strategy.

Other Considerations/Implications

As an information report, there are no communications, environmental, policy, privacy or CPTED implications or considerations at this time.

Due Date for Follow-up and/or Project Completion

Environmental and Corporate Initiatives developed tools to help report authors in their reporting of Environmental Implications to Committee and Council a number of years ago. These tools will continue to be updated to include advice on climate adaptation considerations and applicable reports to Committee and Council will continue to include information about climate change-related environmental implications.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachments

1. Climate Change Implications
2. Preparing for Climate Change (Adaptation)

Report Approval

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Reviewed and Approved by: Catherine Gryba, General Manager, Corporate Performance Department

Climate Change Implications

The implications of climate change are becoming better known as a result of the work of the International Panel on Climate Change (IPCC) which in March released a Synthesis Report written by over 800 scientists from 80 countries, and assessing over 30,000 scientific papers. This Report tells policymakers what the scientific community knows about the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

The key findings of the Synthesis Report are:

- Human influence on the climate system is clear;
- The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts; and
- We have the means to limit climate change and build a more prosperous, sustainable future.

Climate change is having (and will continue to have) effects on local weather and general climate conditions that vary from place to place. While implications have been studied and modelled globally by the IPCC, specific implications for many communities have also been modelled.

The Government of Canada, through Natural Resources Canada, has also produced a report entitled *Impacts to Adaptation: Canada in a Changing Climate* which highlights the following observed changes to Canada's climate so far:

- Warming of 1.3 degrees Celsius, on average, since 1948. This is twice the global average.
- Assuming Canada employs a moderately aggressive strategy to reduce greenhouse gas emissions, temperatures will continue to rise by 2 degrees Celsius by 2050 and 4 degrees by 2080. Most of this warming is expected in the winter season.
- Average precipitation has increased 12% across the country. The prairies and southern Canada have seen the least change so far.
- Increased rate of evaporation from freshwater bodies of water.
- Sea-level rise with the rate along the Atlantic coastline having doubled.
- Increased frequency and magnitude of extreme events.

Toronto

According to the City of Toronto report, "Ahead of the Storm: Preparing Toronto for Climate Change", the projected climate change implications identified for Toronto include:

- Rising summer temperatures leading to a rise in the number of extreme heat alerts, smog alerts, and heat and smog-related premature deaths.
- Shorter, warmer winters leading to the spread of invasive insect species like the mosquitos that carry West Nile Virus and ticks that carry Lyme disease. The City

of Toronto also predicts insects carrying other infectious diseases affecting humans and tree species are likely to migrate from the south.

- Precipitation patterns are changing. An increasing proportion of moisture is from rainfall as opposed to snowfall. Periods of drought are also more common and more severe.
- Extreme weather is increasing. Environment Canada monitors the number of natural disasters in Canada and has reported increases in tornados, storms, blizzards, ice-storms, hail/thunderstorms, floods, and wildfires.
- Surface water availability and water quality is diminishing. Changes in river flows, lake levels, and increasing concentrations of contaminants accumulating in surface water bodies used for drinking water purposes have been observed.

Saskatoon

Research more specific to the Saskatoon context is available from the Prairie Adaptation Research Centre at the University of Regina suggesting the following:

- The Saskatoon region (as part of the South Saskatchewan River Basin) will experience an increase in both temperature and precipitation.
- More precipitation is expected in winter, in the form of rainfall due to rising temperatures, and less in summer.
- Warmer temperatures imply there will be a longer growing season, but there will also be less precipitation in summer, and therefore less available soil moisture.
- The projected changes in temperature will influence snow accumulation in the mountains, which feeds the South Saskatchewan River (Saskatoon's source of drinking water) resulting in changes to the dominant flow season for the river. Future decreases in average river flows are expected.
- Droughts are expected to become more frequent and prolonged.

Preparing for Climate Change (Adaptation)

The goal of preparing for climate change is to increase community resilience by adapting current services, practices, and infrastructure to with-stand current and future climate-related risks.

Community resilience includes, but is not limited to:

- The ability to provide services and continue municipal operations (business continuance)
- Protection for the built and transportation infrastructure of the community to allow municipal and private activities to continue uninterrupted (asset protection)
- Protection, and improvement of 'green' or natural ecological infrastructure (natural capital)
- The ability for residents, businesses, and stakeholders to support one another in times of need (social capital)

Adaptation Toolkit for Cities

Natural Resources Canada has identified a number of climate adaptation activities that municipalities can undertake to reduce the negative impacts of climate change and/or take advantage of new opportunities that may be presented. They note that proactive planning efforts (including adopting policies that support climate change mitigation and adaptation) can result in lower long-term costs and be more effective than reactive efforts (i.e. adaptations that occur following major storm events drought impacts have already been realized). Adaptation planning themes include business continuity planning, proactive development and planning standards, responsive storm water design standards, new operating practices and service levels for core municipal infrastructure development and maintenance, appropriate adaptation of park operations to meet eco-system pressures resulting from climate change, and enhanced community support to build social capital.

Proactive planning for climate change includes the adoption of supportive policies that ensure adaptive measures are included from the most broad policies (i.e. the Official Community Plan) to the most specific (e.g. identifying how utility and park lands are acquired, developed and managed; including climate change considerations into the planning, design and maintenance of infrastructure projects to avoid placing these systems at a greater risk of being impacted; adjusting budgets to reflect climate change risks; etc.).

Toronto

The City of Toronto identified projects and programs to increase that community's level of preparedness for and resiliency to the implications of climate change.

The comprehensive climate adaptation strategy currently being developed for Toronto involves the following principles:

1. Create the internal mechanisms and processes for the development of a comprehensive, multi-year adaptation process;
2. Engage the public, business and other stakeholder groups;
3. Incorporate climate change adaptation into city policies and high level plans;
4. Use best available science to analyze how climate is changing locally and what the future is likely to bring;
5. Use this analysis to identify Toronto's vulnerabilities to climate change;
6. Conduct a risk assessment to identify priority impacts requiring adaptation action;
7. Identify and assess adaptation options to reduce the risk;
8. Develop and implement climate change adaptation strategies; and
9. Monitor climate change, evaluate the effectiveness of adaptation initiatives in protecting the City from continuing changes, and adjust strategies when necessary.

Initiatives identified through proactive planning efforts in Toronto so far include:

- Improved alert systems and weather response plans.
- Changes to storm water management under a Wet Weather Flow Master Plan and changes to design standards for development that reduce heat and runoff (e.g. green parking lots).
- Changes to sewage treatment systems and protection against basement flooding and spills to receiving water bodies.
- Expanded electrical generating capacity and diversity of supply available from distributed generation.
- Improved electricity transmission and distribution systems including redundancy and moving above-ground distribution lines underground.
- Improved transit and multi-modal transportation systems.
- Waterfront improvements to reduce erosion and improve resilience to flooding.
- Adoption of building policies and incentives to increase the prevalence of green roofs that reduce heat and runoff.
- Increased tree planting to double the size of the urban forest.
- Increased green space protection and enhancement.
- The City's role in housing and homelessness was reviewed with the implications of extreme weather in mind.

Mitigating climate change is also a focus of effort for the City of Toronto and a variety of programs and incentives that set energy efficiency, water consumption, and heat island effect performance targets for the design, construction, and operations of the built environment.

Saskatoon

The City of Saskatoon has been focussing on the mitigation of risks through an Enterprise Risk Management approach, including work on the following initiatives that serve to improve adaptability to climate change impacts:

- Improved alert systems including use of Service Alerts and NotifyNow.

- Creation of an Emergency Measures Organization (EMO) office that works with civic and key community stakeholders on weather response planning.
- Completion of a study of the vulnerabilities storm water sewer system and initiation of storm water management planning based on study results.
- Creation of a new Storm Water Utility to generate sustainable funding for infrastructure required to protect against flooding in the community.
- Increased capacity for the storage of drinking water.
- Increased sewage treatment capacity to ensure the system continues to function in wet weather conditions without spilling to the river.
- Improved weather response plans for the urban forest.
- Introduction of the Wetlands Policy to increase the use and functionality of natural or naturalized areas as 'green infrastructure'.
- Planning for improved transit and multi-modal transportation systems through Growing Forward.

The City of Saskatoon is also working on energy efficiency and green energy initiatives to help mitigate the impact the corporation has on climate change. A new Performance Target has been established to ensure civic operations continue to focus on reducing greenhouse gas emissions, striving to achieve a target of emissions that are 30% below 2006 levels.