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May 2007

Climate change: action and adaptation

Climate change is happening right now.

Greenhouse gases, such as carbon dioxide and nitrous oxides, last for hundreds of years in the atmosphere. As a result, the impacts of our actions on the climate are delayed, cumulative and will be felt for generations to come.

This doesn't mean that we shouldn't act now to reduce the impact of climate change in the future. On the contrary, it means we need to act now. If we delay until we experience the impacts of our actions, it may be too late because many impacts will be irreversible.

Cities and local governments have a major role to play in reversing further climate change. Most of the world's – and Canada's greenhouse gas emissions – come from cities and it is estimated that up to half of Canada's emissions can be controlled or reduced by cities.

Many Canadian cities have been very proactive with substantial and imaginative solutions. Municipalities can do much more to reduce emissions, but they need support and resources to move forward. This should include:

- Comprehensive national plans for climate change and transit.
- Adequate financial resources for local governments: including increased transfers and targeted support, such as revolving loan funds and cost-shared financing for infrastructure renewal and energy efficiency projects.
- Involvement of municipalities as partners, with broader legislative tools.
- National and provincial support through a comprehensive framework, including credible commitments, research, substantial actions, regulatory measures, incentives and subsidies.

At the same time, we need to prepare to adapt and protect ourselves from the inevitable climate changes that will affect us over the next few decades.

Unfortunately, despite many different recent extreme weather events and disasters, such as Hurricane Katrina, much too little public attention has been paid to the needs of climate change adaptation recently.

Impacts on municipalities

In Canada, climate change will have big impacts on our water resources, forestry, fisheries, agriculture, tourism, transportation, buildings and other infrastructure, health care and social services. Northern, resource and coastal communities will be particularly affected.

Climate change doesn't just mean warmer temperatures. Some of the most significant impacts will be felt through changes in water conditions which result in more extreme weather events, changing ecosystems with increased risk of pests and diseases, and other impacts through impacts on agriculture, soils, and water and food supply.

Municipalities of all types will be affected by:

- Impact of extreme weather events on municipal infrastructure, including on roads, bridges, buildings, water and sewer networks, electrical infrastructure and flood control systems. These will include floods, storm damage, damaged roads and pavement, weather stress on buildings and other infrastructure.

- Changing temperatures and ecosystems will cause more heatwaves, smog, increased risk of diseases, pests and fires.

- More pressure on health care, social services and community services to cope with the impacts of climate change, such as heat waves.

Adapt now, or suffer later

Adaptation to these changes can be *anticipatory*, with changes planned and made before the impact, and/or also *reactive,* in response to an event or natural disaster.

Planning and making changes before is most effective and least expensive way to prevent major disasters.

For instance, Hurricane Katrina is estimated to have resulted in $150 billion in damages to Louisiana and Mississippi. Much of these costs could have been prevented for a small fraction of the cost if the flood control levees had been properly reconstructed and not delayed for decades.

The 2003 heat wave in Europe is estimated to have caused over 35,000 excess deaths, largely as a result of lack of preparedness and inadequate response.

Emergency response and reaction will always be a major part of adaptation to extreme climate change events such as these. Good planning while making anticipatory changes can help to mitigate the impacts and ensure that emergency responses are effective and rapid. This needs to involve better information, risk assessments, infrastructure improvements, and emergency planning to meet different extreme weather events.

Costs and Consequences

While there has been some research and planning into the problem and costs of climate change adaptation in Canada, much more needs to be done.

A 1999 study estimated the cost of adapting to the current Canadian climate at $11.6 billion a year, not including extreme weather events. On a global scale, the direct losses from extreme weather events increased over 10 times during the 1990s, according to a report from Environment Canada. These costs will continue to escalate unless changes are made – both to reduce carbon emissions and to reduce damages with adaptation measures.

Estimates for the annual costs of adaptation range from 1 to 10% of construction costs, according to the UK government's Stern Review on the economics of climate change.

Since local governments hold more than half of the total public infrastructure assets in Canada, they will also be responsible for a large part of the costs of adapting infrastructure to climate change.

With such a need for investment to reduce the $100 billion infrastructure deficit, it is an excellent time to build in stronger standards and make other changes to deal with the consequences of climate change.

The large risks and uncertainties associated with extreme weather events further underline the need to ensure that public facilities and infrastructure remain under local government control. Local governments could be subject to more class action lawsuits from property owners as a result of extreme weather events. P3 contracts will reduce flexibility for action and compound the risks involved.

Global impact of Climate Change

The concentration of greenhouse gases in the earth's atmosphere has almost doubled since pre-industrial times, mostly because of human burning of fossil fuels. This has caused average global temperatures to increase by at least 0.7℃ during the past 50 years. Current levels are expected to lead to a further increase of about 2℃ by the end of the century.

A few degrees change in average global temperatures may seem insignificant in relation to Canada's annual temperature fluctuations. But in reality, just a few degrees makes a lot of difference. For example, the average global temperature during the last ice age was only 5℃ cooler than it is now. During that period, ice sheets 3 kilometres thick covered virtually all of present-day Canada down to the northern part of the Mid-West U.S. Clearly a temperature increase in the opposite direction would have very severe consequences.

As former World Bank chief economist Sir Nicolas Stern has noted, "A warming of 5℃ on a global scale would be well outside the experience of human civilization, and would transform where we live and how we live our lives," generating "a hostile and extreme environment for human activity in many parts of the world".

Scientists around the world expect that an increase of 2℃ will lead to:

- Increasing regions of drought and increasing flood risks in many areas.
- Hundreds of millions at risk of flooding and becoming climate change refugees.
- Water shortages that could affect 1 billion people by 2020.
- Increases in malnutrition, malaria, and disease and injury due to the consequences of climate change.
- High risk of extinction for 20-30% of the world's species.
- Poor people and poor regions will be hardest hit.

Source: Intergovernmental Panel on Climate Change *Fourth Assessment Report:* Working Group II: *Climate Change Impacts, Adaptation and Vulnerability, Summary for Policymakers*. April 6th, 2007. Page 19. http://www.ipcc.ch/SPM13apr07.pdf

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May 28, 2007