CLEAN ENERGY CANADA

November 17, 2016

BACKGROUNDER

# The Costs of Climate Change

*Prepared by Clare Demerse, federal policy advisor, Clean Energy Canada*

## CLIMATE COSTS IN CONTEXT

Canada's governments are developing a climate plan capable of meeting or beating our national climate goals. An effective plan to hit our targets will require new investment; it will also require adopting some policies that have short-term economic costs.

Inevitably, some will question whether those financial costs are too high.

The reality is that **there are no zero-cost options available**. The status quo carries very significant economic risks from climate change itself—and many of those are large enough to dwarf the costs that any well-designed climate policy package would impose.

To help put the cost of clean growth policies in context, this backgrounder compiles some facts and estimates of the cost of climate change to Canada.[1]

## MORE COSTLY DISASTERS

While the costs of extreme weather events depend on multiple factors, climate change is already increasing the intensity of storms, floods, droughts and other severe weather events around the world.[2] We are seeing this pattern today in Canada.

The Commissioner of the Environment and Sustainable Development reported earlier this year that "severe weather events have resulted in rising costs to governments at all levels and, by extension, to all Canadians."

Specifically, her team found that over the past six fiscal years, "the federal government spent more on recovering from large-scale natural disasters than in the previous 39 fiscal years combined."[3]

**The fund's payouts have grown from a total of $2.4 billion (1970-2008) to $3.3 billion (2009-2015)—a 38% increase.**

---

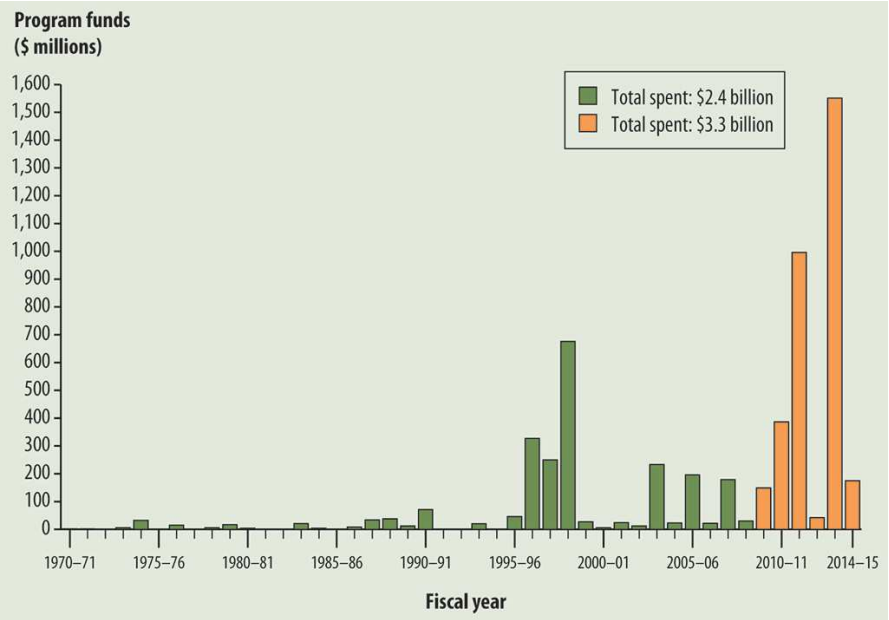
[1] Clean Energy Canada wishes to thank Zizzo Strategy Inc. for their assistance with the research for this backgrounder.

[2] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, http://www.ipcc.ch/report/ar5/syr/

[3] Spring 2016 Reports of the Commissioner of the Environment and Sustainable Development, *Report 2: Mitigating the impacts of Severe Weather Events,* Office of the Auditor General Canada OAGC 2016, http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201605_02_e_41381.html

Since its inception in 1970, the annual costs of the federal Disaster Financial Assistance Arrangements program, which helps provinces and territories recover from natural disasters, have increased:

- from an annual average payout of about $12 million (1970–1994)
- to an annual average of $163 million (1995–2004),
- to an annual average of $373 million (2005-2015).[4]




*Source: Office of the Auditor General of Canada*

Private insurance industry costs due to catastrophic events show a similar pattern of growth.

As the Insurance Bureau of Canada noted in its 2016 assessment, the Bureau "has been reporting on a rise in claims as a result of increases in severe weather events related to climate change" in each of its recent annual assessments. Specifically, the Bureau notes that catastrophic losses—insured losses of $25 million or more from natural disasters—"have increased dramatically over the last decade."[5]

The Insurance Bureau's 2016 statistics (in 2015 dollars) illustrate this pattern. Over the 21-year period from 1983 to 2004, insured losses averaged $373 million a year. **In the decade from 2005 to 2015, the annual average loss more than tripled, growing to $1.2 billion a year.**

The top three years of losses to date were:

- $3.6 billion in losses in 2013, including flooding in southern Alberta and winter storms in eastern Canada

[4] Commissioner of the Environment and Sustainable Development, *Report 2: Mitigating the impacts of Severe Weather Events*, Exhibit 2.1, http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201605_02_e_41381.html#ex1

[5] Insurance Bureau of Canada, *Facts of the Property and Casualty Insurance Industry in Canada 2016*, http://assets.ibc.ca/Documents/Facts%20Book/Facts_Book/2016/Facts-Book-2016.pdf

- $2.4 billion in 1998, mainly from the Ontario-Quebec ice storm
- $2.2 billion in 2011, including Alberta's Slave Lake fires.[6]

However, 2016 is certain to be a record-breaking year: the Fort McMurray fire in May of 2016 alone resulted in $3.6 billion in insured losses, making it the costliest natural disaster for Canadian insurers ever.[7]

Some of Canada's largest catastrophic losses from natural disasters are illustrated in Figure 1.

The trend of higher insurance payouts in Canada aligns with international experience. For example, SwissRe's 2010 report, *Weathering Climate Change*, found that global insured economic losses from climate-related disasters (not including health costs) have jumped from an average of US$5.1 billion per year from 1970 to 1989 to US$27 billion annually over the last two decades.

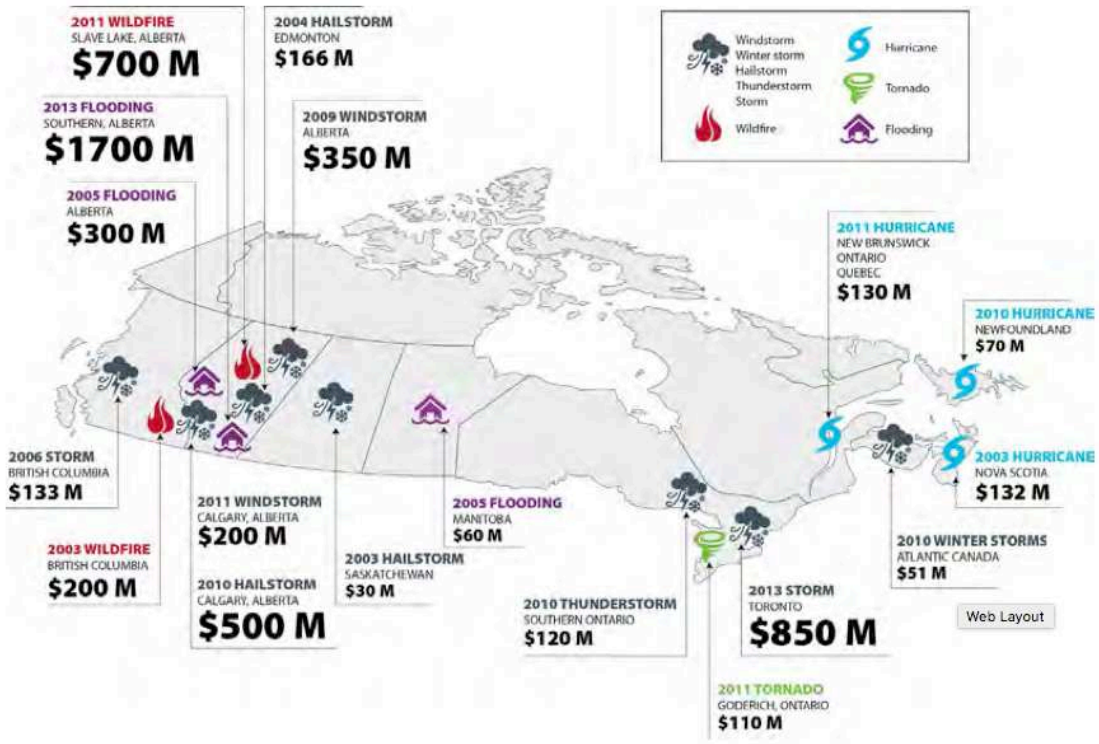



**Figure 1: Examples of Insured Losses from Extreme Weather Events in Canada** *(Source: Canada in a Changing Climate: Sector Perspectives on Impacts and Adaption, NRCan, 2014)*

The above map illustrates some of the natural disasters, and associated insurance payouts, we have seen in Canada in recent years. The accompanying text, from a Natural Resources Canada

---

[6] Facts of the Property and Casualty Insurance Industry in Canada 2016, p. 16-23.

[7] "Fort McMurray wildfires to cost insurers $3.6-billion", *The Globe and* Mail, July 7, 2016, http://www.theglobeandmail.com/report-on-business/fort-mcmurray-wildfire-damage-to-cost-36-billion-insurance-bureau/article30788517/

assessment, notes that scientific studies suggest we will see more droughts (especially in the southern Prairies), heavy precipitation events and accompanying flooding, forest fires, storms and hot days in Canada as a result of climate change.[8]

## COSTS TO SPECIFIC SECTORS OR REGIONS

From real estate to farming, Canadians will feel the costs of climate change across the country and the economy. For example,

- A heat wave in Ontario in March 2012 caused fruit trees to blossom five weeks earlier than usual—and then frosts in April destroyed approximately 80% of apple blossoms. Total losses for tender fruits that year were estimated at $100 million.[9]
- Warmer winter temperatures linked to climate change is the major factor contributing to the outbreak of the mountain pine beetle in Western Canada, which had reduced the economic value of over 18 million hectares of Canadian forest by 2012. These impacts contributed to mill closures and lost jobs.[10]
- Winter roads in northern Canada have already experienced reduced ice thickness and shortened operating seasons, which decreases their reliability and constrains the volumes that can be safely transported over them. Decreased winter road access from a warmer winter in 2006 cost the Diavik diamond mine an extra $11 million, as it had to fly in 15 million litres of fuel.[11]

These sectoral or regional impacts are projected to grow more severe in the future. For example,

- One analysis suggests that approximately $25 billion of Vancouver's real estate could be heavily impacted by sea-level rise.[12]
- The growing concentration of greenhouse gases in the atmosphere is also causing ocean acidification, which is projected to have significant consequences for marine ecosystems along all three of Canada's coasts. An estimate prepared for Fisheries and Oceans Canada in 2002 assessed the value of the threatened fish harvest in the Northwest Territories and Nunavut alone at $3.4 million annually.[13]

---

[8] Warren, F.J. and Lemmen, D.S. (2014): Synthesis; *in* Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, (ed.) F.J. Warren and D.S. Lemmen; Government of Canada, Ottawa, http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/assess/2014/pdf/Synthesis_Eng.pdf

[9] Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, p. 12.

[10] Warren, F.J. and Lemmen, D.S., editors (2014): *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation; Government of Canada*, Ottawa, ON, p. 72. Available at http://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2014/16309

[11] Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, pp. 78–79.

[12] Canada's Ecofiscal Commission, *The Way Forward: A Practical Approach to Reducing Canada's Greenhouse Gas Emissions,* 2015, p. 4. https://ecofiscal.ca/wp-content/uploads/2015/04/Ecofiscal-Commission-Report-The-Way-Forward-April-2015.pdf

[13] The Way Forward: A Practical Approach to Reducing Canada's Greenhouse Gas Emissions, Canada's Ecofiscal Commission, p. 5.

## LOOKING AHEAD: GROWING COSTS

A 2011 economic modelling estimate from the National Roundtable on the Economy and the Environment found that the future cost of climate change for Canada **could grow from approximately $5 billion per year in 2020 to between $21 billion and $43 billion per year by the 2050s—roughly 1% of GDP that year.** This estimate includes costs to traditional economic sectors, "non-economic costs," such as impacts on human health or Canada's ecosystems, costs from sea-level rise, and the potential for catastrophic damages.

The report notes **that "there is a risk those costs could be not just higher, but much higher."**[14] For example, the model found a 5% chance that the economic cost to Canada in 2050 could be greater than $91 billion.[15]

The analysis also estimated financial impacts in three specific areas:

- In the **timber sector**, the impacts of climate change are expected to cost the Canadian economy between **$2 billion and $17 billion per year** by the 2050s.
- Along Canada's coasts, the costs of **flooding from climate change could be between $1 billion and $8 billion per year** by the 2050s.
- Climate change will lead to warmer summers and poorer air quality, resulting in increased deaths and illnesses in Canada's cities. In Toronto alone, **these costs could be between $3 million and $11 million per year by the 2050s.**[16]

## CONCLUSION: SMART CLIMATE POLICIES OFFER EXCELLENT RETURN ON INVESTMENT

Some of the costs listed in this report are unavoidable. Indeed, we are already paying some of them today. It's clear that we have to adapt to the impacts of climate change, and that good adaptation policies will save money by reducing the damage from extreme weather.

However, it's also clear that well-designed policies to cut carbon pollution offer an excellent return on investment for Canada:

- They help reduce the significant costs of climate change itself, and
- They offer clean growth opportunities for Canadians, both at home and in the global clean energy marketplace.

---

[14] Findings in 2006 dollars. National Roundtable on the Environment and the Economy (NTREE*), Paying the Price: The Economic Impacts of Climate Change for Canada* (2011), https://www.fcm.ca/Documents/reports/PCP/paying_the_price_EN.pdf.

[15] Paying the Price: The Economic Impacts of Climate Change for Canada, p. 42.

[16] Paying the Price: The Economic Impacts of Climate Change for Canada, p. 16.