A NEW WORLD

CLIMATE CHANGE IS HERE. SO WHAT DO WE DO NOW?

by Deborah Harford

In 2002, Peterborough, Ont., was drenched by a violent rainstorm of a magnitude seen on average once every 100 years. Two years later, an equally extreme downpour ravaged the town's homes and businesses with what the CBC called "the flood of the century." An unusual cluster of tornadoes caused a third devastating event in August 2005, costing Peterborough and the province upward of $100 million and heavily impacting residents, some of whom had, ironically, recently forked out tsunami relief dollars. Damage from climate-related catastrophes like those that pummelled Peterborough has cost Canadians billions in the past few years, and climate scientists predict that the toll will continue.

Plan A for coping with climate change has been a strong focus on slowing and eventually halting global warming. But ingrained habits and the increased impact of developing countries joining the consumer race mean that what's called "mitigation"—taking action to reduce the negative effects of climate change—is necessary, but not enough: global greenhouse-gas emissions are forecast to rise sharply despite our best efforts.

What's more, current levels of atmospheric CO_2 are enough to raise temperatures to their highest levels since the end of the last Ice Age, according to Ceres, a coalition of more than 80 investor, environmental and public-interest organizations. The much-anticipated *Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC), issued this May, contains an equally sobering statement: "Carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium, due to the time scales required for removal of this gas."

It's rapidly becoming uncomfortably clear that the emissions we have already released, combined with those we will continue to emit, will affect us well into our

Vancouver's Simon Fraser University (SFU) has launched a new initiative to help develop policy options for sustainable adaptation to climate change. In eight six-month segments, the four-year ACT (Adaptation to Climate Change Team) series will examine impacts such as health risks, displaced populations, energy production, fresh water supply, biodiversity, crop adaptation and new technology innovations. Insurance giant Zurich Canada, whose sister branches have been hard hit by climate-related disasters, including Hurricane Katrina and the recent U.K. flooding, has partnered with ACT to create a segment dedicated to extreme weather events. "Climate change is obviously of tremendous importance to Zurich," says Zurich Canada CEO Robert Landry. "Supporting ACT gives us an opportunity to actively support the development of policies that will benefit our customers and society as a whole."

Growing out of concerns raised by renowned economist and SFU professor Richard Lipsey about policy gaps in addressing adaptation, ACT is led by SFU's noted Public Policy program in conjunction with expertise from many other university departments, including Dialogue and Urban Studies. "At SFU, our focus is Thinking of the World," says president Michael Stevenson. "ACT is a valuable resource for Canadian industry, governments, and communities that also has the potential to benefit the international community." ACT's findings for industry will be presented in a series of articles for *Canadian Business* readers. To contact ACT, e-mail program director Deborah Harford at dharford@alumni.sfu.ca, or visit www.sfu.ca/act.

grandchildren's lifetimes.

Plan B, anyone?

Humans have an adaptive advantage over most species: rather than simply reacting to circumstances, we can calculate future probabilities and plan responses in advance. To date, most of the debate around global warming in Canada has focused on Ottawa and the provinces arguing over acceptable levels of greenhouse-gas emissions and ways of reducing them. But it is becoming increasingly obvious that we need to turn at least some attention to dealing with the consequences of climate change that are happening now. It's time to put the adaptive advantage to work.

Thanks to federal, provincial and academic expertise, we have detailed projections of climate change and its potential impacts. The 2004 report *Climate Change Impacts and Adaptation: A Canadian Perspective*, published by Natural Resources Canada's Climate Change Impacts and Adaptation Program (CCIAP), warns of increasingly frequent, severe weather events, such as droughts, storms, forest fires and floods, that will cause serious economic and social impacts. The IPCC's fourth report concurs: "It is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent."

This past summer, England experienced two bouts of violent flooding on an unprecedented scale, a crisis subsequently dwarfed by torrential Asian monsoons that displaced 120 million people. Meanwhile, southern Europe sizzled in a heat wave so intense two countries declared a state of national emergency. Last winter's storms caused power outages and a boil-water advisory for a record two million British Columbians, while the warmest winter weather in 40 years threatened to cancel Ottawa's celebrated Winterlude festival. Some European ski hills stayed brown well into January.

Further warnings in the CCIAP report, echoed in studies released by national and international organizations such as Toronto's Sprott Asset Management, Environment Canada, and the United Nations Environment Programme (UNEP), should raise red flags for every Canadian. Bad news for health includes increased deaths due to heat and smog and contamination of drinking water.

Canada's infrastructure faces a host of problems, most notably an expected one-to-four-metre rise in sea level over the next century—an alarming prospect when a mere half-metre rise will damage causeways, bridges, marine facilities, and coastal real estate. Coupled with high tides and storm surges, even the minimum predicted rise would cause major problems for port facilities and railroad operators, not to mention coastal areas. Replacement value of affected Canadian infrastructure is currently estimated in the hundreds of millions of dollars. Significant warming is also occurring in the north, where melting permafrost poses a threat to railroads, highways and buildings, and opportunities for building ice roads to remote mine sites are dwindling.

Governments will also come under pressure as climate change displaces millions of refugees who may turn to Canada as a safe haven. Food, energy and water shortages may provoke regional and even international conflicts.

In short, climate change will severely affect our local, regional and national economies; indeed, it is already doing so. According to B.C.'s Ministry of Forests, the climate-driven pine beetle epidemic has destroyed 500,000 hectares of timber worth $4.2 billion. A study by the University of Manitoba reveals that drought in 2002 cost the Canadian economy more than $5 billion in agricultural losses. The Munich Re Foundation, established by the reinsurance giant to help minimize costs, estimates global losses due to natural disasters in 2005 at more than US$200 billion, with insured losses topping US$70 billion.

CLIMATE CHANGE WILL AFFECT OUR LOCAL, REGIONAL AND NATIONAL ECONOMIES—IN FACT, IT IS NOW

Despite this grim scenario, some still argue that if there are no guarantees of the changes we can expect, we should not waste time and money planning. According to Patrick Michaels of the Cato Institute, a public-policy think-tank in Washington: "Global warming is real, but it does not portend immediate disaster, and there's currently no suite of technologies that can do much about it." To take this line is to dismiss one of our best chances for survival economically and, in the worst-case scenarios, physically. In the words of the CCIAP report, "Adaptation is not merely an option, it is an imperative."

It's not all doom and gloom. Adaptation includes economic benefits, such as stimulation of the market for innovative technologies and their transfer, expansion of cultivable areas, and fresh transport and commerce opportunities, such as the newly ice-free Northwest Passage.

Many Canadian industry leaders are already implementing their versions of Plan B. Here are five from key sectors, who are among those working to ensure that they, and we, continue to thrive:

BC Hydro, one of Canada's largest electric utilities, provides power to more than 94% of British Columbia's population via an integrated hydroelectric system that generates 90% of its energy from low-emission

IT IS NOT ALL DOOM AND GLOOM. CLEVER ADAPTATION COULD RESULT IN MANY ECONOMIC BENEFITS

sources. Adaptation is a top priority for Bob Elton, president and CEO, who identifies three top-of-mind climate-related threats: extreme events, such as storms, floods, and fires; threats to water supply; and threats to the biosphere, such as the pine beetle. "We don't plan for last year's storm, because we never know exactly what's coming," says Elton, who works with experts to identify climate scenarios. "Instead, we plan for strains on the system."

The concentration of populations into cities intensifies the severity of impacts—urban dwellers are less tolerant of challenges like power outages than those in rural areas. With this in mind, BC Hydro will invest $250 million in adaptation over the next five years. It is also learning from others in the process, including engineers from the notorious Red River, Man., flood plain, who now run wires into substations at roof height rather than ground level to avoid flood-related power outages, as well as leaders in crises, such as the officials who dealt with the fallout from Hurricane Katrina. "Forward-thinking policy for emergency preparedness is becoming a necessity," Elton says. "One end result is that we adapt by beginning to design things differently, and we need to convince regulators this is the prudent thing to do."

Despite unpredictable precipitation patterns, Elton has no intention of changing BC Hydro's energy supply mix away from water as its mainstay. The utility plans 20 to 50 years ahead, and there seems little doubt that sufficient water will still be available in this time frame. There are silver linings to the climate change/energy challenge as well. Wood damaged by the pine beetle can be converted to biofuel, creating unexpected revenue for a beleaguered forestry industry and offering a new, relatively clean source of energy that BC Hydro is considering incorporating.

Elton's last word? "We have to recognize that there may be quicker structural changes in our economy and society than we thought."

Structural changes are also top of mind for Kathy Bardswick, president and CEO of the Ontario-based insurance company Co-operators Group Ltd. She was recently appointed chair of the Institute for Catastrophic Loss Reduction (ICLR), established by Canada's property and casualty insurers to reduce disaster losses and study adaptation research worldwide. Storm- and water-related property damage, a fairly minor issue in the past, is increasing exponentially, Bardswick says, as high winds, hailstorms and flooding become commonplace. "The industry's losses are one thing, but the devastation communities are experiencing cannot be quantified in financial terms," she says. "Look at Peterborough. No insurance payment can replace the baby pictures or ruined businesses."

Co-operators is partnering with the ICLR to pioneer a new standard called the Design for Safer Living, rebuilding two properties—one in P.E.I., the other in Sudbury—to be better equipped to withstand extreme weather, thanks to such strategies as joist reinforcements, calculated tree planting, and reduced wind exposure. Although these options cost up to 18% more than standard rebuilding, Co-operators hopes to create a demand for the new standard and stimulate the market for Canadian products in the bargain. Windows with stronger-than-average glass that Co-operators had to import from Florida turned out to be made in New Brunswick, exported south due to lack of Canadian demand. When you add up the trade-offs, the higher prices make sense: safer-built homes could reduce the potential for all kinds of damage, including break-ins, bringing insurance premiums down.

Other areas of consideration for Bardswick are sea-level-rise damage, life insurance planning mechanisms for business recovery, and disaster responses for epidemics. She also fears the criticism her industry may face if companies refuse to insure because of high risk, and feels the federal government must begin taking a stronger leadership role to stimulate adaptation initiatives. "The time is past for arguing as to whether climate change exists," Bardswick says. "It's happening. And it's critical."

Two thousand kilometres away, in Winnipeg, Dave Sippell, CEO of Canterra Seeds, agrees: "Climate change is top of mind for the seed industry." Agriculture, the most intensely weather-dependent sector, is also one of the most crucial, the source of much of our food supply. According to Sippell, varieties like canola and soybeans are acting as clear indicators of fast-changing weather patterns—but the news is unexpectedly positive. Five years ago, soybeans did not grow in southern Manitoba; now they're doing well. A 2006 University of Alberta study reveals that the western prairies have already warmed by two to four degrees, a figure expected to double by 2050. As a result, early frosts have all but disappeared in the Peace River, Alta., area, where the previously abundant canola variety *Brassica rapa*, an early-maturing crop preferred for its resistance to cold, has largely been replaced by the higher-yielding *Brassica napus*.

Breeders make crosses between plant parents every year. Once a successful cross is made, it's a 10- to 12-year wait until it reaches the market. Canterra steers plant varieties from the testing to the marketing stage; this time delay creates serious challenges as it chooses which varieties to develop, with the main concern being the rapid, unpredictable alteration of the climate. "Any time you're trying to predict only three years ahead, let alone 10, it's very difficult, especially with the rate of climate change we're experiencing now," says Sippell.

As Canada's representative on the

board of the International Seed Federation, Sippell was among those frustrated by the negative tone of a report recently delivered by the UN's Food and Agriculture Organization predicting that agriculture around the equator would be badly hit by global warming. "It said there was no hope," he explains. "We said there is hope, because plant breeding has been dealing with the change for years and years, and we will find genetics that can work in those areas."

The notion of using plant breeding to cope with tough conditions raises the controversy of genetic modification. But Sippell says that traditional plant breeding may be sufficient to solve climate-related problems, such as lack of water and extreme temperatures. Thanks to increased demand for food and shrinking land bases, seeds are being bred for planting in less-than-ideal conditions, including a new type of canola, *Brassica gensia*, intended for drier, hotter, previously unplanted regions of the prairies.

The plants coming into the market currently don't perform as well in weather extremes as Canterra would like, leading to substantial swings in yield, and thus in acreage. The company is watching for varieties that perform well in a wide variety of environments. As the genetics improve, Sippell predicts that acreage will become more solid, benefiting farmers, and the rest of us, with the certainty of a resilient food supply.

Bryce Fraser, vice-president and general manager of Mont Tremblant Ski Resort, knows all about adapting to weather conditions. The iconic resort that he runs in Quebec's Laurentian mountains is a popular venue for both winter and summer escapes, and switching from skiing and snowboarding to golf and outdoor music festivals is business as usual. Even so, winter without snow would be disastrous for Mont Tremblant, which was voted the No. 1 resort in eastern North America by the readers of *Ski Magazine* in 2006.

The mountain is experiencing fewer cold days than usual, and local glaciers are melting; however, Fraser is not unduly concerned, as eastern Canada's winter climate is predicted to remain colder than Europe's, and Mont Tremblant is higher than some of the European mountains that suffered last year's snow drought. Nevertheless, his focus is on flexibility. "You can make snow at any temperature below freezing," Fraser says. "If one of the effects of climate change is shorter periods of extreme cold, as we are seeing, then we have to focus on being as efficient as possible in the cold weather when it's there."

Storm damage at Mont Tremblant has increased in the past five years, with gales causing loss of old-growth forest and building damage, and the resort is adapting by installing wind fences. Switching to a different lift system originally offset some wind-related lift closures; however, in the past two years, they have been creeping back up as incidents worsen.

In an innovative move, the resort has partnered with the Montreal-based Ouranos Consortium, a provincial-corporate-academic think-tank designed to advance the understanding of climate change and adaptation requirements. Ouranos's rough computer-simulated scenarios suggest that Mont Tremblant is well-positioned thanks to the cold ocean current near Greenland, which slows the warming process. Nevertheless, there were some shocks. "According to the projections, southwest Ontario may be semi-arid like the mid-west within 60 years," says Fraser. "There's a lot of speculation flying around."

FROM UTILITIES TO AGRICULTURE, INSURANCE TO TOURISM, BUSINESSES IN CANADA HAVE TO ADAPT—QUICKLY

Up north, warming effects are anything but gradual. Inuvik, N.W.T.–based Guy Pemberton, president of Dowland Contracting, says that northern periods of extreme cold have dwindled, estimating a reduction "from 180 days a year to 130." For Inuit in the Arctic circle, the warming effects are devastating: disappearing snow and ice threaten traditional lifestyles and customs as buildings collapse and the icy coastline recedes. Melting permafrost poses significant challenges for building foundations, which are constructed by drilling holes and dropping in steel pipes filled with a mix of sand and water that then freezes. Dowland has developed techniques to cope with the shift of the "active layer," the term given to the upper layer of permafrost that regularly melts and freezes, notably drilling much deeper, with pilings 45 feet deep as opposed to 25 feet 10 years ago.

In conclusion, from coast to coast to coast to our fourth "coast"—the U.S. border—Canadian business leaders are demonstrating that a combination of Plans A and B, an equal emphasis on adaptation and mitigation, is the ideal approach to coping with climate change. As evidenced by the five examples in this piece, a combination of foresight and agility is helping Canadian industry cope with the damages and benefit from new opportunities. However, it's also clear that high-level leadership and forward-thinking, innovative policy would be valuable assets for sectors scrambling to adjust to a new, and ever-changing, set of problems.

Mobilizing our ingenuity and courage to meet the challenges of climate change will take careful planning, commitment, and a lot of hard work—but then, in Canada, we're good at that. CB