

## Is Canada on a sustainable path?

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### Executive summary

The success of Canadian and all societies depends on a healthy, stable environment. The Federal Sustainable Development Act says that sustainable development needs to integrate environmental, economic and social considerations in decision making, and to consider the needs of the present and future generations.

This paper deals with the question: Is Canada on a sustainable path? It examines a number of major environmental issues both globally and in Canada in the context of sustainability.

On many fronts, the environment is in decline or is changing in ways that will cause disruption to our society. Climate change is simply the biggest of the environmental issues. Despite the problems, Canada has a number of important environmental success stories. The country is making a slow shift towards sustainability shift, but lacks a central focus to the efforts.

## Introduction

The average Canadian is now richer and lives longer than ever before, but unprecedented environmental changes are threatening to undermine generations of economic and social gains. The lifestyles, health and economic development of people in Canada and all countries depend on a wide range of essential ecological goods and services. These include climate regulation, food, fish and timber production, provision of clean air and water, flood control, soil formation and fertility, pollination and biodiversity. Ecosystems also provide spiritual, recreational and cultural benefits.

While populations grow and economies expand, most major global environmental trends have been downward. For the first time in history, humans are changing the atmosphere, increasing our exposure to solar radiation and altering the climate. Air and water pollution is only partly controlled, wilderness is shrinking, many species are in decline, soil quality is being degraded and there are growing water shortages.

In 2009, 28 renowned Earth-system and environmental scientists, including a Nobel laureate, identified nine planetary boundaries which they say define the safe operating space for humanity within the Earth system. They listed climate change, rate of biodiversity loss, interference with the nitrogen and phosphorus cycles, stratospheric ozone depletion, ocean acidification, global freshwater use, change in land use, chemical pollution and atmospheric aerosol loading. They calculated that three boundaries (biodiversity loss, climate change and human interference with the nitrogen cycle) have already been exceeded. (<http://www.stockholmresilience.org/planetary-boundaries>)

Issues such as climate change, smog, fisheries, water quality, forest and biodiversity losses, and toxic chemicals, affect Canada directly. Others, such as deforestation, land degradation and water shortages affect other parts of the world more severely, but Canada will not be totally insulated from the resulting shocks.

The Pentagon, Central Intelligence Agency, and military and foreign policy experts in a number of nations have been looking at the risks of sudden climate change causing serious problems, including sudden mass migrations due to starvation.

In 1996, then US Secretary of State Warren Christopher said: "...pollution respects no boundaries, and the growing demand for finite resources in any part of the world inevitably puts pressure on the resources in all others."  
[<http://www.usgcrp.gov/usgcrp/documents/CWarren.html>] In 2007, UN Secretary-General Ban Ki-moon said that projected climate changes could have serious environmental, social and economic implications, and implications for peace and security. He warned of the risk of limited or threatened access to energy increasing the risk of conflict, a scarcity of food and water transforming peaceful competition into violence. He said floods and droughts might spark massive human migrations, polarizing societies and weakening the ability of countries to resolve conflicts peacefully.  
[<http://www.un.org/News/Press/docs/2007/sc9000.doc.htm>]

## How sustainable is Canada?

Canada is very dependent on healthy ecosystems. The collapse of some fish stocks showed how ecological decline can trigger economic hardship accompanied by personal suffering and dislocation of families. The forest industry faces future supply problems as climate change triggers changes in the forests and worsens insect infestations and fire risks. Retreating glaciers and reduced snowpack in the western mountains threaten water supplies across the Prairies. In the Arctic, the ice is thinning dangerously and structures are sinking as the permafrost melts.

There have been important efforts to put Canada on a more environmentally sustainable footing. Governments and a number of industries have cleaned up some sources of air and water pollution, regulated a number of harmful chemicals, reduced acid rain, better managed forests and fisheries, created parks, and protected and restored a number of endangered species. In some cases, progress has been offset by higher consumption. Each new car is cleaner than its predecessors, but there are more cars. Greenhouse gas emissions from oil sands production are lower per barrel of oil, but long-term plans are for increased oil production.

On a number of major issues, such as climate change, urban automotive pollution, soil and water conservation, and fisheries management, the trends are still not sustainable.

Canada needs to deal with its own environmental problems, but it affects and is affected by what happens in other countries. Over more than a century Canada has signed bilateral agreements with the United States on such issues as boundary waters, air pollution and migratory species. In more recent decades, this country played important roles in a number of global treaties, such as the Montreal Protocol on the ozone layer, biodiversity protection and acid rain. Canada, along with the rest of the world, is seeking an agreement on how to control climate change.

The challenge now is to go beyond simply reacting to environmental problems after they emerge. There is a need to shift to forms of economic development and lifestyles that do not systematically undermine the environmental base that supports all human enterprise.

## **Drivers of change**

There are three key interdependent factors that can be called the major driving forces of environmental change. They are the size of the human population, the per capita consumption of resources (which is usually related to the affluence of a society), and the technologies used to produce and consume these resources.

The world's population is now about 6.8 billion, with UN mid-range projections for 8.3 billion by 2030 and more than 9 billion by 2050. By then, given current patterns, the world will have an economy that is three times larger, and will face greater per capita land and water scarcity.

There now about 33.8 million people in Canada, with a projected 42 million by mid-century, a rise of 24 per cent.

About 85 per cent of the world's energy now comes from fossil fuels (gas, coal and oil) with most of the rest split between hydro and nuclear. Renewables still only provide a tiny fraction of energy needs.

According to *International Energy Outlook 2009*, by the US Energy Information Administration, world marketed energy consumption is projected to increase by 44 per cent between 2006 and 2030, with 73 per cent of that in non-OECD countries. [<http://www.eia.doe.gov/oiaf/ieo/>].

On a per capita basis, Canadians rank among the highest in energy consumption, water use and greenhouse gas emissions. Fossil fuels provide two-thirds of Canada's energy consumption, followed by hydroelectricity (25 per cent) and nuclear (7 per cent). Although there is a boom in renewable energy, it still only supplies about one per cent of the country's demand.

According to Environment Canada's study, *Turning the Corner: Detailed Emissions and Economic Modelling*, the population will rise by 12 per cent between 2006 and 2020, but energy demand and greenhouse gas emissions will both grow by more than 20 per cent. [[http://www.ec.gc.ca/doc/virage-corner/2008-03/571/Annex4\\_eng.htm](http://www.ec.gc.ca/doc/virage-corner/2008-03/571/Annex4_eng.htm)]

## **Some key environmental trends**

### **Climate change**

The world is warming as climate change starts to kick in, with the greatest warming in the Arctic. Around the world, sea levels are rising, threatening the very survival of island nations and the habitability of low-lying regions, now home to hundreds of millions of people.

Among changes now happening or predicted:

- The oceans are becoming more acidic as they absorb carbon dioxide from the atmosphere. This will reduce the ability of marine life to form calcium carbonate shells.
- Melting glaciers will initially increase flood risks, but as glaciers diminish they will release less water, affecting supplies to one-sixth of the world's population, predominantly in the Indian sub-continent, parts of China, and the Andes in South America, but also in North America.
- Species are on the move northward, but some, especially trees, may have difficulty establishing themselves fast enough. There are estimates that 15-40 per cent of species could face extinction after only 2°C of warming.
- Weather patterns are predicted to change with increased risk of droughts and starvation. Declining crop yields, especially in Africa, could leave hundreds of millions hungry. At mid to high latitudes, crop yields may increase for moderate temperature rises (2-3°C), but then decline with greater amounts of warming. At 4°C and above, global food production is likely to be seriously affected.

- Major forests, including Canada's boreal region and the Amazon, are at increased risk of drought and fire.
- Deaths will increase from malnutrition and heat stress, and a number of diseases are moving out of their traditional tropical zones.

Canada is already seeing evidence of climate change, particularly in the north. Signs range from robins in the Arctic to major declines in amount of Arctic sea ice. Declining sea ice is a self-reinforcing trend because of what is known as the albedo effect. With forecasts of ice-free summers in the ocean within decades, Canada's Arctic sovereignty is more open to challenge.

Warmer weather is already making northern winter travel more difficult and dangerous, and is melting the permafrost that supports structures. There is increased erosion on the Arctic coasts, where higher water levels and less ice mean more waves crashing against a shoreline that is less stable.

Another major concern is that as the Arctic melts, there is a high risk that it will release large amounts of frozen methane, which has 30 times the impact of carbon dioxide as a greenhouse gas.

According to the 2007 study *From Impacts to Adaptation: Canada in a Changing Climate*, "The impacts of changing climate are already evident in every region of Canada." They include changes in ice and snow cover, river, lake and sea levels, and plant and animal distribution. More heat waves, forest fires, storm-surge flooding, coastal erosion and other hazards are consistent with observed climate trends. BC glaciers are retreating at a fastest rate in the last 8,000 years.

The report warns that more and stronger heat waves will drive up demand for air conditioning, while lower runoff from western mountain glaciers and lower Great Lakes water levels will reduce hydroelectricity potential. "Reduced water quality and quantity will be experienced on a seasonal basis in every region of Canada."  
[[http://adaptation.nrcan.gc.ca/assess/2007/index\\_e.php](http://adaptation.nrcan.gc.ca/assess/2007/index_e.php)]

The UN Environment Programme (UNEP) has warned that "glaciers and snowpacks, a major source of the Canadian Prairies' water, are declining, and hydrological variability is expected to worsen with climate change, exacerbating competition for water among agriculture, the oil and gas industry, and municipalities."

The costs of extreme weather in Canada since 1996 have been greater than for all previous years combined, due to flooding, droughts, wind, hail, storms and fires.

A recent study by the International Joint Commission said that climate change is already causing a drop in the levels of Lake Huron and Michigan.

There is a global consensus on the need to reduce greenhouse gas emissions.

Under the 1997 Kyoto Protocol, Canada was to cut its greenhouse gas emissions by 6 per cent from the 1990 level, but they have risen by more than 25 per cent. Canada has

had increases in oil and gas production—much of it for export—as well as a large increase in the number of motor vehicles.

At the UN climate convention's 2009 summit in Copenhagen, countries agreed that the global temperature should not rise more than 2 degrees C above pre-industrial levels in order to avoid major interference with the climate system. In February 2010, UNEP released a study estimating that to reach that goal, global emissions need to fall between 48 per cent and 72 per cent between 2020 and 2050. It said this would give at least a 50-50 chance of keeping the global temperature rise below 2 degrees. [<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=612&ArticleID=6472&l=en&t=long>]

The global recession has reduced world energy consumption for the first time in nearly three decades, but Richard Jones, deputy executive director of the International Energy Agency, said in November 2009 that "...with current energy policies, it will quickly resume its long-term trend once the global economy recovers."

Canada's oil sands produce just over half of western Canada's total crude oil output. Oil sands production is expected to grow from over 1.2 million barrels per day in 2008 to approximately 2.2 million b/d in 2015, and to about 3.3 million b/d in 2025 in the Growth Case scenario from the Canadian Association of Petroleum Producers (CAPP). This was based on the assumption that oil sands projects will be developed and brought into service at a pace similar to historical and current trends. [Crude Oil Forecast, Markets & Pipeline Expansions. CAPP, 2009]

Whatever is done to reduce emissions, the world is already locked into some climate change. Some greenhouse gases will persist in the atmosphere for centuries, even millennia, which means warming and sea level rise will continue far into the future.

### **Smog and health**

A wide range of air pollutants directly harm human health, including fine particulates, carbon monoxide, sulphur and nitrogen oxides, acidic particles, lead and mercury. At a global level, more than 2 million people die prematurely every year due to outdoor and indoor air pollution.

In Canada, many air pollutants have been reduced, but smog persists in and around heavily populated areas. According to the Canadian Environmental Sustainability Indicators, the national ground-level ozone exposure increased by about 11 per cent between 1990 and 2006, with increases of 15.4 per cent in Southern Ontario and 14.8 per cent in southern Quebec. [Canadian Environmental Sustainability Indicators, 2008]

Health Canada estimates 5,900 deaths per year in eight Canadian cities can be attributed to air pollution. [[http://www.ec.gc.ca/cleanair-airpur/Health\\_Concerns-WSC8A1FE65-1\\_En.htm](http://www.ec.gc.ca/cleanair-airpur/Health_Concerns-WSC8A1FE65-1_En.htm)]

In Toronto alone, smog is estimated by the public health department to cause 1,700 premature deaths and 6,000 hospitalizations each year.

## Forests

Forests are not just trees, but part of ecological systems that support life, economies and societies with a wide range of ecosystem services. These include prevention of soil erosion, maintenance of soil fertility, and fixing carbon from the atmosphere as biomass and soil organic carbon. Forests host a large proportion of terrestrial biodiversity, protect water catchments and moderate climate change.

Today, only half the world's original forests remain intact, and only one-fifth of those are relatively free of human activity and influence. Global forest cover continues to shrink, mainly because of losses in Africa and Latin America.

In Canada as in many industrialized countries, a reduction in forested area has been reversed by more intensive replanting, but the forest structure continues to change as old forests are harvested and replaced by tree farms. These are generally monoculture plantations of even age, and will be harvested before they become old.

Forests are major carbon sinks, absorbing carbon dioxide from the atmosphere. If they burn or die and decay, they release their stored carbon into the atmosphere. If the climate warms faster than trees can adapt, there is a risk of die-offs before new species establish themselves, and a net return of carbon to the atmosphere.

Already, Canadian forests have been hit both by severe fires and, in the west, by the devastating effects of the mountain pine beetle, which is no longer held in check by cold winters. British Columbia is currently experiencing an outbreak beyond any bark beetle epidemic recorded in North American history. This ecosystem-changing epidemic is causing widespread mortality of the lodgepole pine forests, the province's most abundant commercial tree species. At the current rate of spread, 80 per cent of the mature pine will be dead by 2013, according to Natural Resources Canada.

The insect has migrated east over the mountain ranges, attacking Alberta's lodgepole pine forests and threatening the Jack Pine stands of Canada's northern boreal forest. [[http://www.mpb.cfs.nrcan.gc.ca/index\\_e.html](http://www.mpb.cfs.nrcan.gc.ca/index_e.html)]

In recent years Canada's boreal forests have experienced more frequent fires, releasing enough carbon to transform them in some years from net absorbers to net emitters. Between the 1960s and the 1990s, the total area burned more than doubled. Together insects and drought are leaving vast areas of dead wood in their wake, providing fuel for wildfires. Overall, a warmer climate is predicted to double the area burned in northern Canada by 2100. [[http://www.earth-policy.org/index.php?/plan\\_b\\_updates/2009/update85](http://www.earth-policy.org/index.php?/plan_b_updates/2009/update85)  
[http://www.earthpolicy.org/images/uploads/graphs\\_tables/fire.htm](http://www.earthpolicy.org/images/uploads/graphs_tables/fire.htm)]

## Water

Water availability has been falling to dangerous levels in a number of parts of the world. This is mainly due to increased irrigation to produce more food for a population that is growing and consuming more water-intensive foods, such as meat. One in 10 of the world's major rivers fails to reach the sea for part of each year because of upstream irrigation demands.

UNEP says that by 2025, two-thirds of the world's population could be under conditions of water stress – the threshold for meeting the water requirements for agriculture, industry, domestic purposes, energy and the environment. Climate change will only worsen matters as glaciers, which store snow to release as water in the summer, continue to melt.

Canada is considered water rich, but supplies are unevenly distributed, and subject to flow change and degradation.

The Great Lakes hold one-fifth of the fresh water on the earth's surface, making this one of the world's great ecological systems. During much of the 1900s, water quality in the lakes was in decline, but governments at all levels and businesses spent billions of dollars, and thousands of people have worked on cleaning up and trying to protect the lakes from pollution, habitat destruction, loss of native species and invasions by non-native creatures.

Efforts that began in the 1970s were able to reduce phosphorus discharges that had been causing parts of Lake Erie to turn green from algal blooms. However, algae are again causing problems, apparently as the result of increased phosphorus use, particularly in fertilizers.

Pollution levels in Great Lakes fish have been dropping for 30 years, thanks to controls on chemicals, and more fish are safe to eat. However, there are substances of emerging concern, such as flame retardants, plasticizers, pharmaceuticals and personal care products, and pesticides. They may pose a risk to fish, wildlife or people.

[[http://www.on.ec.gc.ca/greatlakes/State\\_of\\_the\\_Great\\_Lakes\\_Highlights\\_2009-WS27FEC4DA-1\\_En.htm#Contamination](http://www.on.ec.gc.ca/greatlakes/State_of_the_Great_Lakes_Highlights_2009-WS27FEC4DA-1_En.htm#Contamination)]

There are more than 160 non-native species in the Great Lakes, and more keep arriving. At least one-third of the new species arrived in ballast water carried by the more than 500 ocean-going ships that enter the lakes each year. Some invasive species are causing serious disruptions among native species as well as economic damage. Alien species threaten a sport and commercial fishing industry valued at almost \$4.5 billion annually, and which supports more than 80,000 jobs. [Our Great Lakes: a report to the public. Environment Canada and U.S. Environmental Protection Agency, 2004.] The two countries spend about \$18 million a year just on sea lamprey control.

Lake Winnipeg is commonly referred to as Canada's sixth Great Lake, and is probably the large lake most at risk from eutrophication—by some measures more threatened than Lake Erie in the 1960s. Affected by recurrent toxic algal blooms, Lake Winnipeg is situated at the tail end of a vast watershed that drains 90 per cent of the prairie agricultural region, as well as parts of four American states. Nutrient loads on Lake Winnipeg, primarily from municipal and agricultural sources, have apparently exceeded ecological thresholds.

[<http://www.waterinnovationhub.org/research/governance/environment.asp>]

Lake Winnipeg also faces bacteriological contamination of beaches, invasive species, such as the prolific Rainbow Smelt, and the risk of chemical contamination from industrial development. The effect of climate change is also of concern.

[[www.redriverbasincommission.org/Reports/Final\\_LkWpgForum\\_Report.pdf](http://www.redriverbasincommission.org/Reports/Final_LkWpgForum_Report.pdf)]

## **Fisheries**

At the global level, marine fish catches are being maintained only by fishing ever further offshore and at deeper levels. As species are overfished, the industry moves down the food chain to what were less desirable catches.

In Canada over the past century a number of fisheries in the Atlantic, Pacific, Great Lakes and elsewhere have declined or collapsed because of overfishing, habitat destruction and competition from invasive species.

The collapse of a number of Atlantic fisheries, particularly the northern cod stock off Newfoundland, is one of the most dramatic examples of unsustainable development. The fishery lasted for centuries as the harvest did not exceed nature's capacity to produce more fish. Starting in the 1950s, new technologies allowed huge increases in the catch. The northern cod stock was commercially fished out by the late 1980s.

The closure of the northern cod fishery in the early 1990s threw more than 35,000 people out of work. This triggered an economic crisis and social dislocation in eastern Canada, including the out-migration of thousands and hardship for many who remained unemployed.

On the west coast, salmon populations have been fluctuating. The total return of Fraser River sockeye in 2009 was the lowest in over 50 years, and only a small fraction of the number expected. The productivity of this fishery has been declining since the mid-1990s to the point that the sockeye are almost unable to replace themselves.

The Pacific Fisheries Resource Conservation Council, which advises the federal and provincial governments, cited a number of factors. Climate change poses a major threat to the future of Fraser River salmon, not only through direct effects of temperature on the fish, but also through impacts on their food supplies and habitats. The council is also concerned about farmed salmon on sockeye migration routes.

[<http://www.fish.bc.ca/scientific-think-tank-analyzes-declining-fraser-river-sockeye-returns>]

## **Biodiversity**

Biological diversity refers to the huge range of species and variations within species. Biodiversity provides a wide array of services that support human societies, ranging from food and medicines to cultural identity and the healthy functioning of our environment. These natural services are often poorly understood and undervalued when making development choices.

Current biodiversity declines are the fastest in human history. Species are becoming extinct at a rate 100 times faster than the rate shown in the fossil record. In its 2009 assessment, the World Conservation Union said that more than one-third of some 47,000 species now studied are threatened with extinction.

[<http://www.scientificamerican.com/blog/post.cfm?id=iucn-red-list-update-17291-species-2009-11-02>]

The North American Central Grasslands are considered to be among the most threatened ecosystems, both on the continent and in the world.

The Committee on the Status of Endangered Wildlife in Canada lists 585 wildlife species in various risk categories, including 250 endangered, 150 threatened, 162 special concern, 23 extirpated (no longer found in the wild in Canada). There are 13 extinct species. [[http://www.cosewic.gc.ca/eng/sct7/sct7\\_3\\_14\\_e.cfm](http://www.cosewic.gc.ca/eng/sct7/sct7_3_14_e.cfm)]

There are many reasons for species decline everywhere, including habitat loss, overhunting and toxic chemicals. By 1990, woodland caribou in Ontario were found only in the northern half of the lands that they had occupied in 1880, coinciding with the northward shift in logging and roads.

Climate change is likely to become a major force in species change, as seen in concerns about the future of polar bears. The World Conservation Union Red List of Threatened Species says a wide range of species, including corals, seals, whales fish, penguins, turtles and trees, are now being affected or are at risk.

However, there are success stories. The peregrine falcon has been successfully reintroduced into eastern Canada, following the ban of a number of pesticides, and the swift fox is being brought back to the western Canadian plains.

### **Toxic substances**

Toxic chemicals and metals are known to have a wide range of harmful effects. They include mortality, cancer, loss of fertility, birth defects, blood disorders, genetic damage, sex changes, hormonal and other chemical changes, disturbances in the central nervous system, and damage to a number of organs. Some build up in the food chain and in our bodies. Some can affect future generations.

While a number of obviously toxic substances have been banned or controlled, there are thousands of others whose effects on human health and wildlife are uncertain.

Canada and many other nations have banned or restricted a number of toxic substances and their levels are dropping in the environment. However, a number of pollutants travel thousands of kilometres on air and water currents. Inuit populations in the eastern Canadian Arctic and Greenland have among the highest exposures to persistent organic pollutants and mercury from a traditional diet of populations anywhere.

In recent years, researchers have discovered that chemicals not classified as toxic pose a risk to health. These include fluorinated compounds used for fire fighting and stain resistance, and some have been controlled. More recently, there have been controls on the use of bisphenol A (BPA), an additive to plastics. In 2009, Canada moved to ban baby bottles containing BPA.

**What is being done? Success stories**

Over the past four decades, Canada has made considerable progress in dealing with a number of environmental issues. The country was a pioneer in introducing environmental assessments in the 1970s, with the concept of anticipate and prevent rather than react and cure.

Canada has a good track record in controlling acid rain. It has set more conservative quotas in east and west coast fisheries. It signed agreements on pollution controls in the Great Lakes, and spent billions on the job.

For light duty vehicles, such as cars, emissions of NO<sub>x</sub> and VOCs (which form smog) will be reduced by over 99 per cent compared to the pre-control era. They are also much more fuel efficient. However there are more cars on the roads every year.

Canada and the United States have a clean air agreement that covers the reduction of acid rain (once considered Canada's greatest environmental problem) as well as smog.

Canada was a leading country in the negotiations to protect the ozone layer, which screens the Earth's surface from harmful ultraviolet solar radiation. Starting with the 1987 Montreal Protocol, the world has agreed to phase out one ozone-destroying chemical after another. Despite major reductions in ozone-depleting substances, the annual "hole" in the stratospheric ozone layer over the Antarctic is still very large. Scientists estimate it will be mid-century before it heals. This is a sobering reminder of how long it can take for nature to recover once the damage is done.

Since Canada's first park was created in 1885, almost 100 million hectares of terrestrial protected areas have been set aside, an amount equal to 10 per cent of the total land mass. Over 3 million hectares or 0.5 per cent of Canada's oceans are marine protected areas.

Recycling programs are now common, and are gradually being expanded.

Industries have made dramatic reductions in their emissions of raw pollutants to the air, land and water.

The latest Canadian Chemical Producers' Association (CCPA) report says that member company emissions of a long list of pollutants have been reduced by 88 per cent since the association started reporting under its Responsible Care program in 1992. In the case of carbon dioxide, the reduction has been 30 per cent. The report says a unit of chemical product is manufactured with 88 percent less chemical emissions than in 1992.

According to the Forest Products Association of Canada, pulp and paper members have reduced greenhouse gas emissions by 57 per cent since 1990 – 10 times Canada's Kyoto targets. The companies have committed to pursuing carbon neutrality through the supply chain by 2015. Canada plants more than 500 million seedlings a year, meaning forests cut are replanted. Canada has the largest area in the world of forests certified by independent third parties as sustainably managed. Some highly toxic pollutants have been eliminated from pulp and paper mill discharges, and other pollutants have been sharply reduced.

## **A sustainability shift**

Humans use the earth's resources to provide materials and services that fulfill basic needs and aspirations for a better quality of life. The world now faces the challenge of moving to more sustainable forms of development.

Much of the world's economic development took place at a time when there was little concern for its environmental impacts. As a result, governments and companies have been forced into a react and cure mode that turns out to be more costly than preventing problems. This is the old environmental agenda.

Sustainable development tries to link the need for economic development and environmental protection, which needs to be seen as a necessary precondition for economic activity. Pollution emissions need to fall within nature's ability to assimilate and safely detoxify them. Demands on natural resources need to be aligned with natural rates of replacement.

Take the example of energy. According to Lord Nicholas Stern, author of the 2006 *Review on the Economics of Climate Change*, strong, deliberate policies can "decarbonise" both developed and developing economies on the scale required for climate stabilization, while maintaining economic growth in both. He called for:

- Reducing demand for emissions-intensive goods and services.
- Increased efficiency, to save money and cut emissions.
- Action on non-energy emissions, such as deforestation.
- Switching to lower-carbon technologies for power, heat and transport.

On some other key issues:

- Food production needs to stop depleting and eroding soils, and threatening long-term soil fertility and stability.
- Water use needs to remain within renewable cycles.
- Water pollution needs to fall back to within natural rates of assimilation, and persistent toxics need to be eliminated from discharges.
- Air pollution needs to be reduced to stop climate change, and to reduce harm to human and ecosystem health.

## Opportunities for change

Environmental policy experts say that both scientific and policy communities have to see the interconnections among environmental, social and economic issues so they can be dealt with in a more holistic and synergistic manner.

UNEP's *GEO-4* report on the global environment says "Environmental problems range along a continuum from those where proven solutions are available to those where both the understanding of the problem and its solution are still emerging." It found progress in tackling some relatively straightforward problems, such as local air and water pollution in some parts of the world. Most countries have eliminated lead from gasoline, and some, such as Canada, have cut acid rain causing pollution. There has been a steady rise in the area of the earth given some protection from exploitation, and recycling is now becoming more widespread.

It said the world has better science, a more informed public, and a more proactive private sector, but has yet to cross the threshold of sustained action and staying power to reverse an overall environmental decline. It said people can undo and reverse some of the damage, and adapt to some of the inevitable changes, but that delay worsens the problems, and increases their complexity and cost.

In 2008, the Canadian government passed the Federal Sustainable Development Act, which says: "sustainable development means development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This draws directly from the 1987 Brundtland Report, *Our Common Future*, which popularized the term, and launched the sustainability movement.

The act goes on to say the federal government, "accepts the basic principle that sustainable development is based on an ecologically efficient use of natural, social and economic resources and acknowledges the need to integrate environmental, economic and social factors in the making of all decisions by government."

## Need leadership

Although there are many examples of sustainability in Canada, there is no overall vision or common approach. At times groups even criticize each other for not acting in harmony. There is a need for leadership to convene and foster collaboration.

More than two decades ago, a group of Canadian environment ministers, along with industrial, environmental and academic leaders, formed the National Task Force on Environment and Economy. In its 1987 report, the task force said: "Governments act as trustees of the resources we will pass on to future generations. Governments must therefore exercise comprehensive and farsighted leadership in supporting and promoting sustainable economic development." This unique and historic group called for governments to form round tables on environment and economy that would bring leaders from governments, business and society together to achieve consensus on how to integrate economic and environmental planning. Their report called for good will,

leadership and new processes for decision making and planning. They recommended conservation strategies as “blueprints for sustainable economic development.”

In 2007, the Canadian Council of Chief Executives, representing the heads of Canada's leading enterprises, said Canadians must reduce their environmental impact, and specifically called for Canadian public policy to reduce greenhouse gas emissions. In a policy declaration calling for leadership, the CEOs said: “Canada needs a coherent national plan of action on climate change, one that sees governments, industry and consumers working together toward shared goals.” It called for emission cuts and investments in new technologies to help Canada and the world achieve a rising standard of living with a reduced environmental impact.

**END**