Our Fair Share

Canada's Role in Supporting Global Climate Solutions

Clare Demerse

April 2009

The Pembina Institute
Sustainable Energy Solutions

Our Fair Share

Canada's Role in Supporting Global Climate Solutions

Clare Demerse

April 2009

the PEMBINA institute
Sustainable Energy Solutions

Demerse, Clare
Our Fair Share: Canada's Role in Supporting Global Climate Solutions
published April 2009
Printed in Canada
Production management: Lori Chamberland
Design/Layout: Roberta Franchuk
Cover Photos: Main image: istock. Smaller images: 1. Flickr, aokettun 2. Flickr, mknobil 3. Solar Electric Light Fund 4. Johanne Whitmore

ISBN 1-897390-22-X

The Pembina Institute
Box 7558
Drayton Valley, Alberta
Canada T7A 1S7
Phone: 780-542-6272
Email: info@pembina.org

Additional copies of this publication may be downloaded from the Pembina Institute website: www.pembina.org.

About the Pembina Institute

The Pembina Institute is a national non-profit think tank that advances sustainable energy solutions through research, education, consulting and advocacy. It promotes environmental, social and economic sustainability in the public interest by developing practical solutions for communities, individuals, governments and businesses. The Pembina Institute provides policy research leadership and education on climate change, energy issues, green economics, energy efficiency and conservation, renewable energy, and environmental governance. For more information about the Pembina Institute, visit www.pembina.org or contact info@pembina.org.

About the Author

Clare Demerse joined the Pembina Institute's Climate Change Program in 2006 and became Associate Director of the program in 2009. The program is a centre of expertise on Canadian greenhouse gas reduction policy, with a particular focus on carbon pricing. Clare researches and analyzes government policies to address climate change. She works with a range of stakeholders and acts as a spokesperson in the media. Clare previously worked on Parliament Hill and holds a master's degree in journalism from Carleton University in Ottawa. She is a 2008-2009 Gordon Foundation Global Fellow.

Acknowledgements

This report was made possible thanks to the Walter and Duncan Gordon Foundation, which awarded a Gordon Global Fellowship to Clare Demerse for 2008–2009.

The author wishes to thank Natasha Sawh from the Walter and Duncan Gordon Foundation, who contributed invaluable guidance throughout this report's preparation. I would also like to offer my sincere thanks to my two mentors in this project, Erik Haites and Alden Meyer. Both also acted as reviewers for this report, along with Tom Athanasiou, Mark Lutes and Brian Tomlinson. Despite the very useful comments and suggestions provided by these reviewers, the author retains full responsibility for the content of the report and any remaining errors and omissions.

Thanks to Pembina colleagues who helped with this work, especially Matthew Bramley and Paul Cobb. Thanks as well to Chris Coughtrey and Patrick Demerse for technical assistance.

Our Fair Share

Canada's Role in Supporting Global Climate Solutions

Contents

List of Figures

List of Tables

List of Fact Boxes

Our Fair Share — Executive Summary

In December 2009, countries will gather in Copenhagen, Denmark to hammer out the next global climate deal. The agreement they plan to reach there will take effect once the first phase of the Kyoto Protocol ends in 2012.

National targets to cut greenhouse gas (GHG) emissions are easily the best-known aspect of the UN climate framework. But they're just one of the "building blocks" needed for a successful outcome in Copenhagen. This report concerns another crucial piece of the puzzle, financial support for climate action in developing countries. It is clear that there will not be an agreement in Copenhagen without meaningful progress on the question of financing.

Developed countries first accepted an obligation to provide financial support for climate action in poorer countries over 15 years ago. The 1992 UN Framework Convention on Climate Change creates an obligation on the world's richest countries to provide financial support to developing countries for action on climate change, including both reducing their GHG emissions and adapting to climate change.

Examples of adaptation expenses include building infrastructure strong enough to withstand more violent storms; training farmers in new techniques to deal with drought; and investing in malaria prevention in new regions as the disease spreads. Financing for emission reductions ("mitigation") would, for example, cover the extra cost a country would incur to power homes with electricity generated from wind energy instead of coal. These investments are urgently needed to protect some of the world's most vulnerable people from the consequences of a problem they did little to create.

People in developing countries are often more vulnerable to climate disasters because of higher rates of poverty, lack of "climate-defence" infrastructure and lack of access to insurance.

Photo: flickr, aokettun

Estimates of Financing Needs

Although it's not possible to reach a precise assessment of the funding required, a range of estimates shows that it will run into the tens or even hundreds of billions of dollars per year. No matter which estimate you choose, an indisputable conclusion is that far more finance is needed than is currently being provided. For example, the finance currently devoted to climate adaptation, both from bilateral and multilateral sources, is at most C$4.4B/year[1] — less than one-third of the

lowest estimate of what developing countries need for adaptation, and 26 times less than what the UN Development Programme says is needed annually by 2015. These assessments of the climate financing needs are over and above the official development assistance (ODA) that developing countries require for poverty reduction.

Numerous countries have already put forward plans to generate, manage and disburse climate financing. Some of these proposals feature "innovative" fundraising mechanisms, such as a levy on airline emissions, that would generate funds without countries having to make annual budget decisions about whether to contribute again. Unconventional means of raising funds offer significant promise in generating the finance required to tackle climate change.

Canada's Role

In recent years, Canada has faced sustained public criticism for positions it has adopted at the UN climate negotiations. Despite successful forays into support for climate adaptation (using ODA funding) in the past, Canada has not yet recognized the scale of financial resources needed to avoid dangerous climate change or publicly acknowledged that it must play an important role in securing new resources for some of the world's most vulnerable people.

Canada now has a narrow window of opportunity to contribute to a successful outcome in Copenhagen. The UN climate negotiations resume in June, and G8 leaders will meet in July at a summit where climate change is expected to feature prominently on the agenda. In advance of those meetings, Canada should:

- Acknowledge that the scale of financing needed will run into the tens, or possibly even hundreds, of billions of dollars per year.
- Commit to providing Canada's fair share of that need. Formulas that assess countries' responsibility for financing show that a fair contribution from Canada is approximately 3 to 4 per cent of the global total. Multiplying that percentage by indicative estimates of the public finance needed for climate action in developing countries produces an estimated range for Canada's "fair share" of C$2.2B to C$5.7B per year.
- As a "downpayment" on the Copenhagen agreement, the Government of Canada should provide adequate funding for the most urgent adaptation needs identified by Least Developed Countries under the UN's National Adaptation Programmes of Action process. Canada's fair share of the over US$1.5B total is at least C$80M.

1. Introduction

2009 is a critical year in the fight against global warming. December 18, 2009 is the deadline countries have set to agree on a new global climate deal that would complete a two-year negotiation process launched in 2007. The Danish capital of Copenhagen will host the final two weeks of negotiations, and the agreement reached there will take effect once the first phase of the Kyoto Protocol ends in 2012.

Scientists tell us that the world's emissions need to peak and start dropping by 2020 at the latest if we are to avoid disastrous consequences from global warming. The Copenhagen agreement will set the targets and rules for that crucial window of opportunity.

This report provides an overview of one of the central issues on the negotiating table en route to a successful deal in Copenhagen. Financial support from rich countries for climate action in developing countries is one of the "building blocks" needed to construct the next global climate deal. As a wealthy country with high per capita greenhouse gas (GHG) emissions, Canada has a responsibility to provide support for climate action in poorer countries. The sections that follow outline the financial needs, some of the options for providing that support, and an estimate of Canada's "fair share" of the global financing effort.

2. Context

To understand what's at stake in Copenhagen, picture the atmosphere as a bathtub with the taps turned on. Like the water filling the bathtub, GHG emissions don't just drain away: they can persist for anywhere between decades and thousands of years after they're released. Over the past 200 years, we've filled the bathtub almost to the top, and most of the "water" came from the world's developed countries.[3] Some water is already splashing over the edge, and if the taps aren't turned off soon, the whole bathroom floor could collapse.

> "Whilst recognizing our shared responsibility for the future, we cannot wish away historical responsibility for the problem. The fact of the matter is that the carbon space is finite and 70% of the "safe" carbon space has already been used up, largely by industrialized countries."
>
> *— Marthinus van Schalkwyk, South African Minister of Environmental Affairs and Tourism (2009)*[2]

The negotiations on reducing GHG emissions (known as "mitigation") are really about how to divide up the last few inches of bathtub space between the nations of the world. But that's only one of four building blocks that countries agreed would form the foundation of the next global climate deal. The second building block identified in the "Bali Action Plan," the document that countries agreed should guide the current negotiations, is adaptation to the climate change that is already inevitable. Returning to the bathtub analogy, the adaptation discussions are about the best ways to protect the people who get flooded each time the bathtub overflows. The third building block, technology transfer, is about helping developing countries avoid turning the taps fully on the way the developed countries did. With technology cooperation, they can instead move directly to clean energy systems with low or zero emissions.

This report focuses on the fourth and final building block, financing. The Bali Action Plan defines this as "[e]nhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation."[4]

Developed countries first accepted an obligation to provide financial support for climate action in poorer countries over 15 years ago. The 1992 UN Framework Convention on Climate Change (UNFCCC), the international treaty that is the basis for the climate negotiations, creates an obligation on the world's richest countries — a group known as "Annex II" countries — to provide financial support to developing countries for GHG reporting, mitigation, technology transfer, adaptation, research, and other activities. The Convention notes that developing countries' ability to fulfill their commitments "will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources."[6]

> "Without significant finance you will not get developing country engagement [in negotiations]. Funding is key to unlocking an outcome for the talks."
>
> *— Yvo de Boer, Executive Secretary, UNFCCC (2009)*[5]

Canada is one of 192 countries to have ratified this convention, and is among the 23 countries (plus the EU) included in its "Annex II". Canada also ratified the Kyoto Protocol, a treaty created under the convention in 1997. Kyoto set specific

emission reduction targets for industrialized countries; it also re-iterated the financing obligations set out in the Convention. Both treaties note that countries share "common but differentiated responsibilities" for climate action. (For more detail on the legal obligation for financial support, please see Appendix C.)

The fulfillment of these longstanding obligations has now become a top priority, and it will certainly form a central part of the next climate deal. It is clear that there will not be an agreement in Copenhagen without meaningful progress on the question of financing.

Fact Box 1: Fundamental Environmental Principles

Two environmental principles are at the core of any discussion of financing climate action. The first is the *polluter pays principle*, which was officially recognized by the OECD in 1972. The principle states that "the polluter should bear the expenses of carrying out pollution prevention measures or paying for damage caused by pollution". For example, a company that contaminates the land around its factory is responsible for the costs of cleaning up.

"Polluter pays" is balanced by "ability to pay". In the factory example cited above, a multinational corporation likely has a much greater ability to pay than a small, family-owned business.

This differentiation between polluters is reflected in the principle of *common but differentiated responsibilities*. According to the OECD,

> "common but differentiated responsibilities" refers to the shared responsibilities of countries for the protection of shared resources, with the caveat that these responsibilities may be different depending on the contribution of the country to the environmental problem and its capability for addressing the environmental problem. In other words, developed countries will be asked to carry more of the immediate burden of achieving sustainable development on a global basis, because they may contribute more to environmental degradation and they have greater financial and technical resources."

This principle is included in most international environmental agreements, including the United Nations Framework Convention on Climate Change.[7]

3. Financing for Climate Action

3.1 What Financing Would be Used for

The Bali Action Plan outlines several uses for the new financial resources under negotiation. These include:

- **Support for "nationally appropriate mitigation actions"** — For example, financing could cover the extra cost a country would incur to power the homes in a community with electricity generated from wind energy instead of coal.
- **Funding to "assist developing country Parties that are particularly vulnerable to the adverse impacts of climate change in meeting the cost of adaptation."** — Examples of adaptation expenses include building infrastructure strong enough to withstand more violent storms; training farmers in new techniques to deal with drought; and investing in malaria prevention in new regions as the disease spreads.
- **Scaling up access to "environmentally sound" technologies in developing countries through technology cooperation** — For example, Germany and China could enter into a partnership to develop and build new geothermal energy units under a multilateral technology cooperation mechanism.
- **Capacity building** — An example would be a request from Malawi for financial support to conduct research on likely climate impacts and then share the knowledge with local health care workers.

Although this report focuses on financing for adaptation and mitigation, the estimates presented here include technology transfer and capacity building. It is also likely that the Copenhagen agreement will include financing for slowing the rate of deforestation in developing countries. (In the UN negotiations, this is known as REDD, or "reducing emissions from deforestation and forest degradation.") A detailed discussion of how to provide REDD financing is beyond the scope of this report. However, an estimate of the financing required for deforestation is included in the overall mitigation estimate found in Section 3.1.2.

3.1.1 Financing Needed for Adaptation

Climate change is already happening, and more is inevitable, for several reasons. First, overhauling the world's energy systems to dramatically cut our GHG emissions is a massive project. It's urgent that we make this transition at top speed, but even at that pace, it will take several years before global emissions begin to fall. Second, the slow response of the oceans creates a time lag (of a few decades) before global surface temperatures fully reflect the increasing concentration of GHGs in the atmosphere. Even if we could somehow stop all new emissions today, the planet is already "locked in" to roughly double the warming we've seen to date from the GHG pollution that's already in the atmosphere.[8] So no matter how successful we are in cutting emissions from now on, we also need to protect people, ecosystems and economies from the damage we've already done.

The consequences of unchecked climate change are almost certain to be catastrophic for some of the world's poorest and most vulnerable people. For example, projections of future climate impacts in Africa from the Nobel Prize-winning Intergovernmental Panel on Climate Change include: [9]

- "By 2020, between 75 million and 250 million people are projected to be exposed to increased water stress due to climate change."
- "In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020." (In sub-Saharan Africa, 90 per cent of agriculture is "rain-fed," i.e., does not use irrigation).[10]
- "Towards the end of the 21st century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5–10% of Gross Domestic Product (GDP)."

> "Difficult questions of fairness suffuse the climate debate but are particularly stark in the case of adaptation: those most vulnerable to climate change are the ones least responsible for it."
>
> *— Ian Burton, Elliot Diringer and Joel Smith (2006)*[11]

Dramatic changes are already happening. A 2004 World Health Organization study concluded that the "modest" warming that has taken place since the 1970s "was already causing over 150,000 excess deaths annually by the year 2000."[12] Hot-weather diseases like malaria and dengue fever have shown their capacity to spread into new territory as temperatures rise. (For example, temperatures in Kenya's highlands were up to 4°C higher than usual in the year 1997–98. In that period, the incidence of malaria increased by 300 per cent over the baseline average of the years 1995–2002.)[13] In a recent publication, the Government of India noted that adapting to a "high degree of climate variability" (including floods, droughts and other extreme weather events) already costs 2 per cent of India's GDP — a cost that India's government expects to rise "significantly" in the years to come.[14]

The UN Development Programme's (UNDP) 2007/2008 Human Development Report draws a distinction between climate risk, which exists throughout the world, and climate vulnerability, which is much higher in poor countries. As the report notes, people living in the Ganges Delta and lower Manhattan "share the flood risks associated with rising sea levels. They do not share the same vulnerabilities."[16] Developing countries are more vulnerable to climate disasters because of their higher rates of poverty, greater social inequality, lack of "climate-defence" infrastructure, and lack of access to insurance.[17]

> "Climate change also brings new challenges to the control of infectious diseases. Many of the major killers are highly climate sensitive...In sum, climate change threatens to slow, halt or reverse the progress that the global health community is now making against many of these diseases."
>
> *— World Health Organization (2008)*[15]

The consequences of this vulnerability can be seen in weather disasters statistics for 2000–04, a period that saw one in every 19 people in a developing country affected by a weather disaster, on an annual average basis. In OECD (developed) countries, the comparable figure was one in every 1,500 people.[18]

In a related example, insurance industry data shows that

disaster losses from extreme weather as a percentage of national income were three times higher in low- and middle-income countries than in higher-income countries for the years 1984–2003.[19]

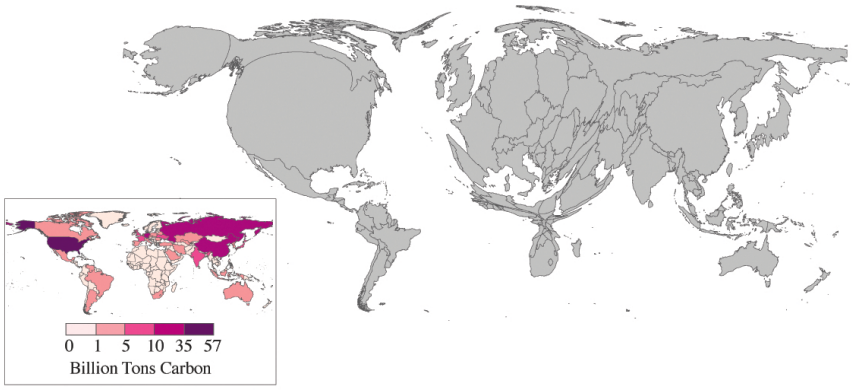

Figure 1. World map scaled according to countries' cumulative emissions

Figure 2. World map scaled according to estimates of per capita mortality from climate change in 2000

The world's poorest people have contributed little to global GHG emissions, but are the most vulnerable to the impacts of climate change. Figure 1 shows the world's countries scaled according to their cumulative CO_2 emissions to 2002. Figure 2 shows countries scaled according to the World Health Organization's estimates of per capita mortality from climate change in 2000.

Credit: Patz, Jonathan A. et al, "Climate Change and Global Health: Quantifying a Growing Ethical Crisis," *Ecohealth*, Vol.4 (2007): 400, with kind permission from Springer Science and Business Media

Although the need to adapt is indisputable, it is not yet possible to make a precise estimate of what the costs of adaptation will be. First, too little adaptation has taken place on the ground at this stage to have the data needed for detailed estimates of costs, or even of needs.[20] In addition, the amount of adaptation finance needed in the decades ahead will depend on the world's success in reducing GHG emissions. There is now a broad consensus among leading scientists and many countries that an increase of 2°C in the global average temperature (relative to the pre-industrial level) constitutes dangerous climate change. If countries make the emission reductions needed to stay below that level, adaptation costs over time will be far lower than if warming moves into the truly catastrophic consequences that lie beyond the 2°C threshold.

The financial need will also vary depending on how timely and effective the investments are. Adaptation spending falls into two major categories: taking steps to prevent problems ("anticipatory") and responding to crises once they occur ("responsive"). Using a medical analogy, the Government of Switzerland refers to these categories as "preventative" and "curative" adaptation,[21] with "prevention" being the category of proactive investments that protect communities and strengthen their resilience, while "cure" is the emergency relief needed when disasters haven't been prevented. (According to the UN's International Strategy for Disaster Reduction, natural hazards on their own do not cause disasters. Instead, it is the combination of an ill-prepared, vulnerable population and a natural hazard that produces disasters.[22]) Experience around the globe shows that investing in prevention is consistently far less expensive — not to mention safer — than spending money on a "cure" after the crisis has occurred.[23]

> "Faced with the threat to human development posed by climate change, the world needs a global adaptation financing strategy. That strategy should be seen not as an act of charity on the part of the rich but as an investment in climate change insurance for the world's poor and as an investment in human development."
>
> *— UN Development Program, 2007*[24]

Another area of uncertainty about adaptation spending concerns its close links to official development assistance (ODA). The 23 member countries of the OECD's Development Co-operation Directorate currently invest an average of 0.3 per cent of their Gross National Income in bilateral and multilateral assistance to developing countries.[25] In some cases, funding for climate adaptation covers similar ground to the funding provided through ODA.

For example, the UNFCCC's 2007 assessment, *Investment and Financial Flows to Address Climate Change,* notes that the "fundamental adaptation requirement" in the health sector is to strengthen public health systems.[26] Strengthening public health systems is already a goal of existing ODA in many developing countries — which means that the two sources of financial support can reinforce each other. Conversely, the failure to take climate adaptation into account could limit the progress currently being made through public health investments in developing countries.

While climate financing can, and should, be complementary to ODA, the two should not be conflated. The needs created by climate change are new and additional to the poverty reduction goals of existing ODA. (Section 3.3 provides more information on the "additionality" of climate finance.)

Strengthening public health care systems in developing countries is a fundamental part of climate adaptation. Research shows that women are particularly vulnerable to the impacts of global warming.

Photo: Flickr, mknobil

But as the UNFCCC notes in a 2008 paper, the categorization of financial assistance — i.e., the boundary between ODA and climate finance — is an important question that requires resolution in order to attain an "effective mobilization" of resources.[27]

This becomes clear when reviewing the existing estimates of adaptation financial needs. Four organizations have produced estimates of adaptation needs that are frequently cited: the World Bank, the UNFCCC, Oxfam, and the UNDP. In today's Canadian dollars, the estimates range from C$14.7B to C$116.3B per year for developing countries.[29] The gap between them is large, and it is primarily caused by differences in the way that the organizations characterize adaptation.

> "The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem. Their low incomes make it difficult to finance adaptation. The international community has an obligation to support them in adapting to climate change. Without such support there is a serious risk that development progress will be undermined."
>
> — *Sir Nicholas (now Lord) Stern, from the* Stern Review *(2006)*[28]

The World Bank's 2006 estimate calculates the additional cost of "climate proofing" planned infrastructure investments to make them resilient to climate change; for example, a bridge might need to be re-designed so that it can withstand higher floods. This estimate produced a range of US$9–41B (year not specified), and is the smallest of the four included here.

At the other end of the spectrum, the UNDP has produced an estimate of US$86B per year by 2015. This estimate includes US$40B/year in strengthening poverty reduction efforts to "climate proof" people, on top of the funding needed to climate-proof infrastructure. The UN agency also includes annual funding for disaster response.

Oxfam's estimate includes support for climate-proofing existing and new infrastructure. It also factors in community-level support (for households, communities and NGOs) as they take on smaller-scale adaptation activities. This produces a total of "at least [US]$50 billion annually"; by what year is not specified.[30]

Finally, the UNFCCC arrived at its estimate by analyzing potential adaptation needs in five sectors: agriculture, forestry and fisheries; water supply; human health; coastal zones; and infrastructure. In each case, the estimates are further broken down to illustrate the share of adaptation that will take place in developing countries. The result is a range of US$28–58B per year in developing countries in 2030.[31] (For more detailed information on adaptation estimates, see Appendix B.)

The UNFCCC notes yet another unknown in the cost of financing climate adaptation, which is the contribution of the private sector. Since a large part of the adaptation needs will be in poor and vulnerable communities, it seems likely that the majority of the finance will have to be supplied by the public sector. However, the private sector may be able to play a role (for example, by providing insurance to communities that currently lack it, or when government policies require adaptation actions[32]) and private philanthropic dollars may also be able to make a contribution.[33]

No matter which estimate you choose, one indisputable conclusion is that far more finance is needed than is currently available — a gap that the Government of Switzerland has called a "financing chasm"[34]. Appendix D provides a listing of the amount of finance currently devoted

to climate adaptation in developing countries, both from bilateral and multilateral sources. The total is at most C$4.4B/year — less than one-third of the World Bank's lowest estimate and 26 times less than the UNDP's estimate.

3.1.2 Financing Needed for Mitigation

The story is similar when we turn to mitigation: here, also, current spending is not even close to what's needed. The good news is that all estimates show that the costs are manageable if countries take meaningful action with urgency.

In 2007, the Intergovernmental Panel on Climate Change found that an emission reduction deep enough to offer a chance of avoiding dangerous climate change would reduce the annual average growth in global GDP by less than 0.12 percentage points.[36] A 2009 McKinsey & Company study of the costs of staying below 2°C of global warming (relative to the pre-industrial level) found that the total cost by 2030 would be less than 1 per cent of forecasted global GDP in that year, and that the annual investments needed to reach that goal (C$1.3 trillion in 2030) are equivalent to just 5–6 per cent of total business as usual investments.[37] The UNFCCC's 2007 report found that the additional investment and financial flows needed in 2030 to address climate change are "small in relation to estimated global gross domestic product (0.3–0.5 per cent) and global investment (1.1–1.7 per cent) in 2030."[38]

> "We recognize that developing counties, including emerging markets like China and India, have entirely legitimate development needs and cannot be asked to forfeit the aspirations of their people to a better life and a higher standard of living. Even now, for example, nearly 35 per cent of Chinese live on less than $2 a day. And India's per capita income and emissions are a fraction of those in OECD countries."
>
> *— Todd Stern, U.S. Special Envoy on Climate Change (2009)*[35]

As it did for adaptation, the UNFCCC's 2007 report provided a detailed sector-by-sector estimate of additional spending needed to reduce emissions (see Appendix B). The report's "mitigation scenario" would cut global GHG emissions to 25% below the 2000 level by 2030,[39] which is consistent with about a 50 per cent chance of avoiding 2°C of global average warming.[40] The total financing needed to achieve that scenario is US$200–210B in 2030, of which about US$85–90B would be needed in developing countries.[41] This estimate includes emission reductions in the following areas: fossil fuel supply, power supply, industry, buildings, transportation, waste, agriculture, and forestry, along with finance for technology research, development and deployment (RD&D).

It is likely that the private sector can provide a much greater share of the financing needed for mitigation than for adaptation. For example, a company might decide to pay the cost of switching to more efficient vehicles once governments put a price on GHG emissions high enough to make that investment economic. The UNFCCC's report states that the private sector was responsible for 60 per cent of all investment in 2000, with governments supplying 14 per cent and households 26 per cent.[42]

As with the adaptation estimates, these figures should be seen as indications of the scale required, not as precise assessments. The true cost will depend on the level of ambition that countries choose and the pace they set to get there. Costs may fall dramatically over time as

technologies develop; they may also rise if the science indicates that emissions need to be cut even more deeply than we thought. Investments in capacity building could rapidly expand countries' ability to absorb and deploy clean technologies. And public funding is sometimes required even when emission reductions pay for themselves over time (as, for example, many energy efficiency investments do) because market barriers, such as lack of information, can prevent companies and homeowners from making the investments. In addition, countries' ability to use financing efficiently may increase over time, as they move from pilot programs to full-scale deployment of green technologies.

3.2 Closing the Gap

This review of the costs of adaptation and mitigation produces two clear conclusions. One is that the cost of curbing global warming is dwarfed by the cost of the damage that unchecked climate change would cause. In his authoritative 2006 review of climate change economics, Sir Nicholas (now Lord) Stern concluded that the economic cost of unchecked climate change would be 5–20 times greater than the cost of taking action to reduce emissions.[43] The other clear conclusion is that we need to spend much more on tackling climate change than we are currently spending. One 2008 review of current spending and estimated needs (including mitigation and adaptation) found that "the ratio between existing and required resources to fight climate change could be anywhere between 1:10 and more than 1:100. The average of all cost estimates points to a ratio of around 1:50."[44]

Countries will close that gap in different ways. For developed countries like Canada, the private sector, individuals and governments will finance the cost of cutting emissions and adapting to climate change. Developing countries, even major economies like China and India, have far fewer domestic resources to draw on, and pressing poverty reduction needs. In their case, the funds they can make available for reducing emissions (see Fact Box 2) need to be supplemented by financing from developed countries like Canada.

> "The message from a developing country perspective is clear: We take our responsibilities seriously. We are already making a meaningful contribution within our respective capabilities. We are willing to do more. But the trigger must come from the North."
>
> *— Marthinus van Schalkwyk, South African Minister of Environmental Affairs and Tourism (2009)*[45]

Emissions per capita in the 100 most vulnerable countries — a group of African countries, small island states and least developed countries which are home to over a billion people — are so low that this group is responsible for just 3.2 per cent of the world's total GHG pollution.[46] For these countries, the urgent priority is adaptation, and the funds will have to be provided by developed countries.

Fact Box 2: Climate Action in Developing Countries

South Africa

In 2006, South Africa's government commissioned a detailed economic modelling exercise called the Long Term Mitigation Scenario. Based on the results of this process, South Africa adopted a target of "plateau and decline" for its national emissions. Under the target, emissions will stop growing between 2020 and 2025, hold steady, and then begin declining in absolute terms between 2030 and 2035. The government says that this allows South Africa to make a contribution to global emission reductions that aligns with avoiding 2°C of global warming. To reach the target, South Africa plans to strengthen its energy efficiency requirements, fund research and public education, and is studying a carbon tax. After public consultations, the government plans to announce a policy package to meet its targets by the end of 2010.[47]

Mexico

In 2005, Mexico enacted a law requiring that 8% of its electricity come from renewable sources (excluding large hydro). Mexico's government is funding the installation of 60,000 solar photovoltaic systems and has established energy efficiency standards for appliances that were estimated to save 8 Mt CO_2e in 2006. Mexico released its *National Strategy for Climate Change* in May 2007. The strategy identified emission reduction opportunities in Mexico's economy that could reduce annual emissions by 107 Mt CO_2e by 2014. The strategy includes reduction opportunities from co-generation at oil sector facilities; energy efficiency programs for industry; the installation of 7,000 MW of renewable energy capacity; and a reforestation program called ProArbol, which would reforest an average of 400,000 hectares/year from 2007 to 2012.[48] This strategy is currently being used to develop a national climate plan, and the government is considering including a cap and trade system in the plan.[49]

China

China's Eleventh Five Year Plan, which covers 2006 to 2010, set a domestic target of reducing energy consumption per unit of GDP in 2010 to 20 per cent below the 2005 level. According to the U.S.-based Natural Resources Defense Council, this will constitute the single largest emission reduction program by any country if China meets its goal.[50]

China funded a total of 792 industrial energy conservation projects in 2006–07, and is distributing 50 million energy-efficient light bulbs to citizens. In 2005, China enacted a law that gives priority grid access to renewable energy. Currently, China ranks fifth in the world in installed wind capacity and first in installed solar capacity.[51] China strengthened its 2004 fuel efficiency standards for vehicles in 2008; even before that increase, China's mandatory standards were more stringent than the standards set through Canada's voluntary approach to vehicle fuel efficiency.[52]

3.3 New and Additional Finance

One of the most important concepts in thinking about finance is "additionality," which is also known as "incrementality." This means determining whether a financial contribution is part of a government's existing commitments or is truly a new allocation on top of "business as usual" spending. In practical terms, additionality means that one of the first questions to be asked about any government financing contribution must be, "Is this new money?"

As noted in Section 3.1.1, some adaptation activities bear a close resemblance to the activities governments are already funding through ODA. This is also true for some mitigation activities, although to a much lesser extent. Development assistance has an essential function, namely reducing poverty in impoverished countries, that governments and citizens want to see continued and increased. In estimating climate finance needs, analysts take the current level of ODA (along with other contributions to international cooperation not counted as ODA) as a "baseline," and add a layer of new climate finance needs on top of that foundation. If governments instead announce "new" climate funding that is actually re-labelled ODA,[53] the result is that funding falls short of what's been promised, because a gain on one side of the equation is paid for by a loss on the other.

This practice of "robbing Peter to pay Paul" is also ruled out by the UN climate convention, the Kyoto Protocol and the Bali Action Plan, each of which specify that financial resources must be "new and additional." That's not to say that ODA and climate financing are not complementary; the two kinds of support re-enforce and strengthen each other as long as one does not *replace* the other.

The UNFCCC estimates that US$7B per year will be needed for climate adaptation in agriculture, forestry, and fisheries in developing countries by 2030.

Photo: Johanne Whitmore

In fact, numerous developing countries and NGO observers have pointed out that climate finance and ODA are distinct types of obligations, because funding for climate adaptation has its origin in the "polluter pays" principle. As Oxfam explains, developed countries must provide funding not simply because they are wealthier, but also "on the basis of polluting countries providing compensatory finance to those most vulnerable to the effects of that pollution."[54] This is an international version of the logic that requires a company to provide the funds needed to clean up a local river after a chemical spill.

As Figure 3 (below) shows, public financing for climate action in developing countries is one part of a portfolio of funding sources. Because the financing needs are so large, each of the sources shown in Figure 3 has a critical role to play.

On the left of the figure is development aid, which helps to build stronger communities and infrastructure and thus plays a part in strengthening the capacity of people, communities and countries to adapt to climate change by reducing their vulnerability. The next category, new sources of climate finance, provides the funding needed for new investments in adaptation, mitigation, technology cooperation and capacity building to tackle climate change. In addition to the financing mechanism, or mechanisms, that will be agreed to in Copenhagen, countries will likely also provide support through bilateral and multilateral arrangements. The climate

financing in turn supports the triangle on the right, which represents developing country government policies that reduces emissions.

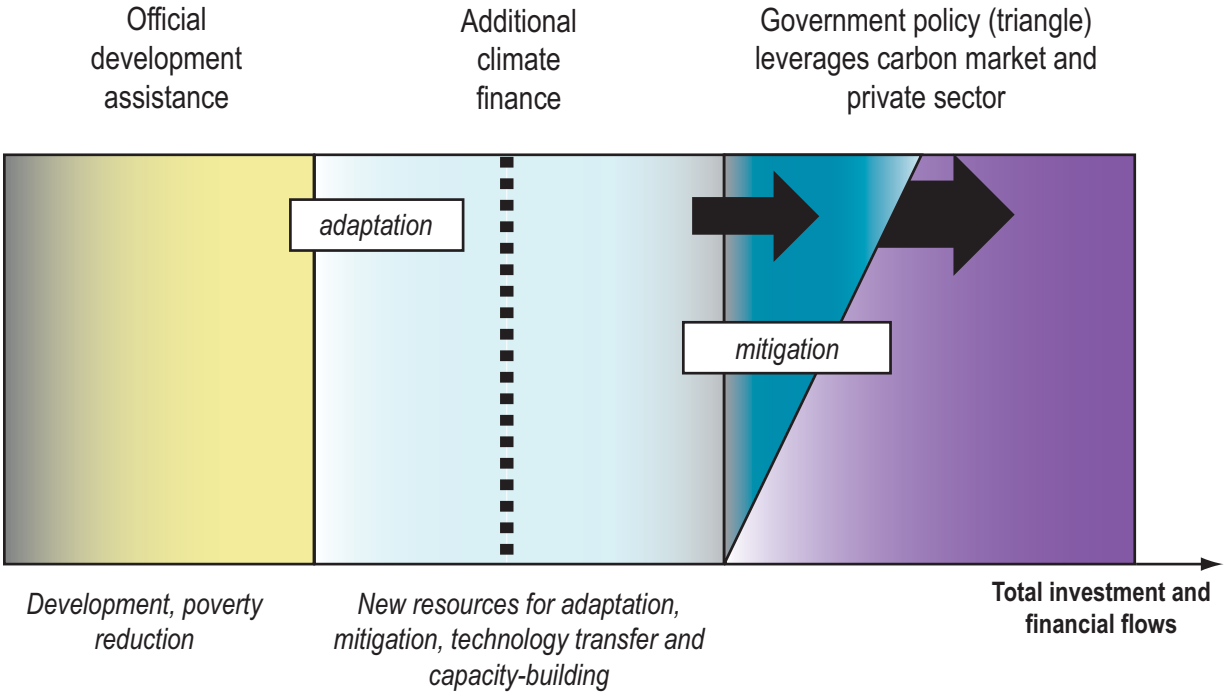

Figure 3. Financing in developing countries

Over time, developing country governments will initiate mitigation policies, some with outside financing support and some without, that drive new private sector spending on emission reductions. As the UNFCCC's analysis notes, the private sector has a large contribution to make in financing mitigation, and that role is likely to grow over time. Thus, an optimal use of financing support for mitigation is to invest it in an area that lays the groundwork for future private sector investments. (For example, a developing country government might use financing support for a wind energy pilot program that helps nurture their renewable power sector.) The two arrows in Figure 3 represent leveraging, with financing helping to leverage government policies, which in turn leverage private sector mitigation (and potentially even adaptation) activities.

Given the size and complexity of the financing picture, it will not be simple to ensure that climate finance is both additional and invested in way that effectively leverages the emission reductions needed to avoid dangerous climate change. Fortunately, countries have put these question squarely on the table at the UN climate talks through a phrase that has come to be known as "MRV," which stands for "measurable, reportable and verifiable."

This language comes from the Bali Action Plan, which countries agreed to in December 2007. It states that for developed countries, the Copenhagen agreement will address "measurable, reportable and verifiable nationally appropriate mitigation commitments or actions," including numerical targets for all developed countries. The plan also states that the Copenhagen agreement will address "nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and

capacity-building, in a measurable, reportable and verifiable manner."[55] This formulation is interpreted as requiring mutual accountability: developing countries' mitigation actions will be measured, reported and verified, but so will the support that developed countries must provide for these actions. Developed countries' emissions reductions will also be measured, reported and verified. (See Appendix C for more detail.)

A number of countries have proposed that a voluntary registry of developing country mitigation actions would help to match action with support. South Korea's detailed submission suggests that the UNFCCC Secretariat open a registry in which developing countries list "focused actions to be taken" to reduce emissions, such as setting energy efficiency standards or introducing a cap and trade system. Beside each entry, countries would specify the type of support they require. A unilateral commitment by a national government (see Fact Box 2 for examples) would require no outside support and no mandatory MRV assessment. However, a stricter building code might only be possible with financial support from a developed country, and private sector investment in more efficient public transit may depend on government tax credits. In these cases, MRV assessment would be required. South Korea also suggests that countries would register the expected GHG reductions and the timeline for implementing the policy. If a country lacks the capacity to take a certain type of action, the government could simply register its need for capacity-building support.[56]

Whether or not countries choose to adopt a registry approach, they will have to determine how best to "match" the available financing with the best opportunities for deploying clean technology. The MRV mechanism will also have to determine whether or not contributions that developed countries provide through bilateral or multilateral arrangements outside of the UN are eligible to be recognized as "MRV". Clearly, a water-tight mutual MRV system is a key piece of the puzzle in Copenhagen, as it will play a critical role in giving countries confidence that financing is both additional and effective.

Over time, the provision of climate finance may also require changes to the way ODA is reported through the OECD's Development Co-operation Directorate. As noted above, climate finance can cover some similar areas to development finance, but must also be additional to development finance commitments. The provision of 0.7% of gross national income (GNI) is the internationally accepted UN target for ODA; thus, a donor's existing commitment to reach 0.7% is the appropriate context for assessing the additionality of climate finance.

For countries like Canada, which have not reached the 0.7% goal, the baseline for assessing additionality would be governments' timetables of planned ODA increases. As part of the Copenhagen agreement, governments may take on a separate timetable of climate finance investments that grow over time. In order to disentangle the two types of finance, "financing for adaptation that is included as ODA must be clearly identified and must be subtracted from ODA to determine the performance of that donor against the 0.7% target," according to Canadian aid expert Brian Tomlinson.[57]

3.4 Carbon[58] Markets

The Kyoto Protocol's Clean Development Mechanism (CDM) allows developed countries to count emission reductions from projects in developing countries towards their GHG targets. Companies and financial institutions invest in projects to reduce emissions, gain approval for the

projects from the CDM's Executive Board, and then sell the resulting Certified Emission Reduction (CER) credits to interested buyers. In 2007 and early 2008, the average price for CERs sold under contract (i.e., in the "primary" market) was US$13.60/tonne.[59] The CDM has grown to become one of the most significant sources of mitigation finance in developing countries, with over US$45B either invested or expected to be invested in projects that entered the CDM's "pipeline" in 2007 alone.[60] By April 2009, over 1,500 projects were registered, and these are expected to generate over 1.5 billion tonnes of "certified emission reductions" by the end of 2012.[61]

Despite the CDM's success in generating projects and credits, the mechanism has run into significant additionality problems of its own. The CDM's Executive Board requires project developers to demonstrate that their project would not have gone ahead without the incentive provided by the CDM market. If the project would have happened even without that incentive, then it's part of business as usual and should not be eligible for credit. Although the CDM's Executive Board has set up a complex set of rules to police additionality, some researchers have concluded that "only a fraction" of CDM projects create additional emission reductions.[62]

The future of the CDM is also on the negotiating table en route to Copenhagen. Many countries support reforming this mechanism so that it funds policies, programs or sectoral approaches instead of individual projects.[63] For example, a reformed CDM might fund a national renewable energy deployment program instead of a single wind farm. If the CDM is restructured in a way that significantly increases its environmental stringency, it could make a useful contribution to mitigation after 2012.

Renewable energy technology, like the solar streetlight shown here, is an important way to reduce GHG emissions from fossil fuel use.

Photo: Solar Electric Light Fund

However, the use of the CDM in a post-2012 agreement raises yet another additionality issue. At present, countries with Kyoto targets can use CDM credits to reach those targets, thus replacing or "offsetting" domestic emission reductions with emission reductions that take place overseas. Climate science shows that avoiding 2°C of global warming will require both significant emission reductions (to 25–40 per cent below the 1990 level) in developed countries by 2020 *and* "substantial deviation from baseline" emission levels in many major developing countries.[64] This means that staying aligned with the science requires that developed countries both meet significant reduction targets — potentially meeting a portion of those reductions through a reformed, stringent "CDM 2.0" — *and* support other emission reduction policies in developing countries through mitigation financing. In combination, these efforts must add up to the global emission reductions needed to avoid dangerous climate change.

3.5 Innovative Finance

The Bali Action Plan requires countries to consider "innovative means of funding" to help vulnerable countries meet the costs of adaptation (see Appendix C). Unconventional means of raising funds offer significant promise in generating the finance required to tackle climate change, and have important additionality advantages as well.

In a 2008 paper on adaptation finance, Benito Müller explains the distinction between conventional and innovative finance as follows:

"Foreign public sector investments/payments — whether bilateral or multilateral — have traditionally been in the form subscribed to by ODA, namely grants or (concessional) loans financed through the general budget of the donor country — i.e. based on revenue from conventional instruments such as income tax, cooperation tax, customs and excise duties, etc. For the present purposes, this is referred to as "conventional funding," as opposed to funding which is raised through new, in particular, carbon-based instruments such as the auctioning of emission permits in the context of an emissions trading scheme, which, as such, is genuinely additional to the conventional revenue."[65]

Although the term is flexible, innovative finance tends to be non-discretionary and, frequently, international. An example would be a tax on the carbon content of aviation fuel to be levied on all international flights. Once agreement is reached on a tax, it would raise funds without countries having to make annual decisions about whether to contribute again. As an international tax, the revenue it produces would not "belong" to any specific donor country, which opens the door to a more equitable relationship between donors and recipients. It would also have the advantage of reducing "competition" with aid dollars, because it is generated in a different way, making it clearly — and measurably — additional to current ODA funding. Finally, a carbon tax on aviation fuel would have the benefit of creating an incentive for this fast-growing sector to reduce its GHG emissions.

At the UN climate conference in Poznan, Poland in December 2008, countries finalized the administrative and legal requirements to launch an innovative financing scheme under the Kyoto Protocol. The Adaptation Fund raises money through a 2 per cent levy, or "share of proceeds," on sales of CDM credits. It is governed by a board weighted in favour of developing countries and operates under the "authority and guidance" of the 184 countries that have ratified the Kyoto Protocol. The fund will provide vulnerable countries with direct access to financing that covers the full cost of "concrete adaptation projects and programmes that are country driven and are based on the needs, views and priorities of eligible Parties."[66] From 2008 to 2012, the fund is expected to raise between US$400M and US$1.5B.[67]

Fact Box 3: Examples of Conventional and Innovative Financing

Conventional: The Montreal Protocol's Multilateral Fund

The Montreal Protocol is the 1987 UN treaty that controls emissions of substances that deplete the ozone layer. The London amendment to the treaty created the Multilateral Fund for the Implementation of the Montreal Protocol in 1990. This fund finances emission reductions in developing countries with low emissions of ozone-depleting substances (this group is called "Article 5 countries" in the Protocol). Article 10 of the Protocol states that developed countries must provide additional financing to cover "all agreed incremental costs" that Article 5 countries incur in complying with the Protocol. Article 5 of the Protocol notes that developing countries' implementation of the Protocol "will depend on the effective implementation of the financial co-operation as provided by Article 10 and the transfer of technology as provided by Article 10A."[68]

Parties to the Montreal Protocol agree on a replenishment to the budget of the Multilateral Fund every three years; for the period 2006 to 2008, the total budget was US$470M.[69] Developed countries' contribution to the Multilateral Fund are determined through a formula that is based on the UN's "assessed contributions" scale. Canada's share, which is a voluntary contribution that is counted as ODA, is 2.798 per cent of the total budget.[70]

Innovative: Solidarity Levies for UNITAID

In September 2006, the UN announced a new initiative to improve access to treatment for HIV/AIDS, malaria and tuberculosis in developing countries.[71] The initiative is known as the International Drug Purchase Facility, or UNITAID. UNITAID's budget is raised primarily through levies on airplane tickets, which have been implemented in France, Chile, Guinea, Mauritius, Niger and the Republic of Korea.[72]

France implemented a "solidarity contribution" in July 2006, adding €1 to the cost of an economy-class ticket for domestic and intra-European flights and €4 to the international flights. For business class travellers, the levies are €10 and €40 respectively. In 2007, 90% of the tax collected in this way was dedicated to UNITAID, for a total of €160 million.[73]

UNITAID's 2006–2007 revenues, which totalled US$369M, came from eight countries, including Brazil, Chile, Norway, the UK and Niger. The Gates Foundation also contributed US$10M.[74]

A UN General Assembly Resolution from 20 December 2006 recognized "the value of developing innovative sources of financing from various sources on a public, private, domestic and external basis to increase and supplement traditional sources of financing."[75]

4. Countdown to Copenhagen

4.1 Principles

With less than a year to go in the "Countdown to Copenhagen," many countries have tabled proposals describing ways to generate the finance required for mitigation, adaptation, capacity-building and technology cooperation. Section 4.2 below provides an overview of some of the major proposals. To determine which proposals have the best potential for success, it is worthwhile to review the principles they aim to fulfill.

Potential new sources of financing raise several policy questions, including:

- How will the funds be generated?
- How will they be managed and governed?
- Who will receive them? How will they be disbursed?

Some proposals focus primarily on the first question, while others give more emphasis to the latter two. In the course of the negotiations, it is likely that elements of these proposals will be combined. New ideas may still be brought into the negotiation process, although the timeline is already very tight.

The Bali Action Plan identifies four criteria that climate financing must meet. Financial resources must be "new and additional," and also "adequate, predictable and sustainable."[76] In a 2008 backgrounder, the environmental organization WWF identified some supplementary principles that they suggest should guide countries in negotiating a financing agreement. These include:

- *For generating funds:* polluter pays, effort sharing
- *For managing funds:* transparency, accessibility, effectiveness, representation of both providers and recipients of funds
- *For disbursing funds:* equity, sovereignty (recipient countries set their own priorities), transparency
- *For disbursing funds (adaptation):* prioritizing the most vulnerable.[77]

A civil society declaration entitled "Towards a Global Climate Fund," which was presented to countries at the December 2008 UN climate talks, includes all the principles above and adds several others. These include the generation of funding that is "substantial, obligatory and automatic," and a requirement that the fund's activities "strengthen rights" and contribute to sustainable development for people in recipient countries.[78]

4.2 Proposals

The **Norwegian** proposal is an example of innovative financing based on an auction of "the right to pollute". Thirty-seven countries accepted targets to reduce their emissions under the Kyoto Protocol. The emissions up to a country's target level are known as "Assigned Amount Units,"

or AAUs. In the first Kyoto commitment period (2008–12), countries received these units for free. Norway's proposal is to withhold a small percentage of countries' AAUs after 2012 and auction them in carbon markets, with the proceeds of that auction dedicated to financing adaptation (although the proposal "doesn't rule out the possibility of raising funds for other purposes.") Norway estimates that an auction of 2 per cent of countries' AAUs would raise between US$15–25B annually; the proposal does not specify by what year it would reach this level.[79]

Measured against the criteria in Section 4.1, Norway's proposal aligns well with the "polluter pays" principle, as it requires the countries most responsible for GHG emissions to date to provide the financing (only industrialized countries are currently required to hold AAUs). The generation of the funds would be automatic and obligatory, but the amount of funding generated would depend on market prices for carbon. Norway's proposal is virtually silent on the questions of managing, governing and dispersing the funds.

For the Norwegian proposal to be effective, countries will have to avoid the temptation of "cap inflation," which means trying to negotiate weaker targets post-2012 to "make up" for the AAUs they will lose to the auction. Cap inflation would have two negative consequences: counties' softer targets would reduce the world's chances of avoiding dangerous climate change, and the auction would raise less money thanks to lower demand for AAUs. Norway notes this possibility in its proposal, stating that "if the cap is set more loosely the price will decrease."[80]

On behalf of the group of Least Developed Countries, **Maldives** presented a proposal for a levy on international air tickets. Following the lead of the French solidarity levy (see Fact Box 3), Maldives proposes to charge €4 per economy-class passenger and €40 per business class passenger, and expects to raise US$8–10B annually from this levy. The proceeds would go towards the Kyoto Protocol's Adaptation Fund. Maldives notes that economic analysis predicts a drop of about 0.5 per cent in air travel as a result of the fund, "an order of magnitude less" than the predicted annual air travel growth of over 5 per cent.[81]

Maldives offered a different interpretation of "polluter pays" than the Norwegian proposal, targeting individual polluters — particularly those flying in business class — instead of countries. Like Norway's, this proposal provides a means of generating funds that is obligatory and automatic. By dedicating the revenues raised to the Adaptation Fund, this proposal aligns with many of the criteria identified in Section 4.1, including transparency, representation of both donors and recipients, equity, and prioritizing the most vulnerable.

> "Countries will be asked to meet different requirements based upon their historical share or contribution to the problem and their relative ability to carry the burden of change. This precedent is well established in international law, and there is no other way to do it."
>
> *— Al Gore, 2007*[82]

Switzerland's proposal aims to raise funds for adaptation through a global carbon tax of US$2/tonne CO_2e on all emissions from the use of fossil fuels, which would add about 0.5 cents/litre to gasoline prices. Switzerland includes a "basic tax exemption" of 1.5 tonnes of CO_2e per person, which means that countries with high per capita emissions would pay the tax on a much greater proportion of their emissions than low-emitting countries. Switzerland expects that this tax would raise a total of about US$48.5B in 2010. Countries would contribute a share of the

devoted to prevention and the other to "insurance" for climate disasters, including relief, rehabilitation and recovery. Contributions to the fund would be differentiated according to countries' per capita GDP: high-income countries would contribute 60 per cent of their tax revenues to the fund, middle income countries 30 per cent, and low-income countries none, with the result that 76 per cent of the fund's contributions would come from high-income countries. Only middle- and low-income countries would be eligible to receive finance from the fund. The remainder of the tax revenues would be devoted to National Climate Change Funds, autonomous domestic funds that can be used for adaptation or mitigation.[83]

Switzerland takes a "blended" approach to the polluter pays principle with this proposal. It targets individuals and companies engaged in a polluting activity, namely burning fossil fuels, to generate the funds, and then redistributes the funds in a manner that is weighted toward developing countries (although all countries would also retain a portion of the funds they raise domestically through this tax). Switzerland does not provide a rationale to demonstrate that the "basic exemption" in its tax plan is adequate to protect the most vulnerable people from undue cost increases. Once countries put the policy in place, a carbon tax would generate funding in an obligatory and automatic manner. Both middle and lower-income countries would be eligible for funding from the Multilateral Adaptation Fund, an approach that may not effectively prioritize the most vulnerable. Switzerland provides relatively little detail on the governance of the Fund, although its submission notes that the prevention pillar should reflect the principles of aid effectiveness.[84]

Mexico proposed the establishment of a World Climate Fund ("Green Fund") for mitigation, adaptation, technical assistance and technology diffusion that would operate under the authority of the Conference of Parties (COP), the UNFCCC's decision-making body made up of the convention's 192 member countries. The Mexican proposal states that all countries would contribute to the fund, with their shares determined through a formula that includes GHG emissions, population, and GDP. The formula would take into account historical emissions, per capita emissions, carbon intensity, and GDP per capita. Contributions based on this formula could be scaled up over time to generate more financing, but Mexico states that the fund should generate no less than US$10B annually from the start. Eligible areas for investment from the fund would include energy efficiency, carbon capture and storage, green building programs, and reforestation. Developing countries could opt not to contribute, but then they would not be eligible to receive finance from the fund. All countries that contributed would be eligible for financing from the fund, although developed countries' use of the fund would be capped. All contributions would also be subject to two levies: one going to the Kyoto Protocol's Adaptation Fund, and a second for a proposed new Clean Technology Fund.[85]

Mexico's proposal attempts to reflect the polluter pays principle in the generation of funds through the use of indictors for responsibility and capacity. Although Mexico does not specify the balance between those indicators (the proposal states that this should be determined through negotiation), it is notable that Mexico's proposal would allow both contributions from all countries and disbursement to all countries. This means that Mexico's proposal is unlikely to reflect the criterion of prioritizing the most vulnerable in disbursing funds for adaptation as effectively as other proposals do. Mexico's proposal would raise funds through the conventional means of national budget allocation, which is not automatic. Mexico states that the governance of the fund would be under the Conference of Parties to the UNFCCC, with a balanced representation of developed and developing countries in governing the fund.

Finally, the largest group of developing countries (known as the **G77 and China**) proposes that all developed countries contribute between 0.5 and 1 per cent of their gross national product (GNP) to a new financial mechanism operating under the Conference of Parties. The new financial mechanism would fund the "agreed full incremental costs" of mitigation, adaptation, the deployment of low-carbon technologies, capacity building, research and development, preparation of national plans, and patents. The Conference of Parties would provide the "authority and guidance" for the mechanism, and will set its policies, priorities and eligibility criteria. The Conference of Parties would also appoint a board and create a series of specialized funds, each advised by an expert group.[86] According to the UNFCCC's analysis, this mechanism would generate between US$201B and US$402B per year, using 2007 GDP data.[87]

A briefing note from the Government of India explains that locating a funding mechanism under the Conference of Parties is important because it helps to ensure that the funding will "follow the priorities of recipient countries and not those of source countries."[89] (Developing countries make up the overwhelming majority of parties to the UNFCCC.) The principle that recipient countries should set priorities for the use of development funds is well-established internationally, including through the 2005 Paris Declaration on Aid Effectiveness and the 2008 Accra Agenda for Action.

> "We must develop appropriate protocols to ensure that low-carbon technology is effectively developed and diffused. The fortunate among us also have a responsibility to assist developing countries in adapting to the previously unanticipated burden of climate change."
>
> — *Todd Stern, Special Envoy on Climate Change, U.S. State Department (2009)*[88]

The G77 and China's proposal does not specify the means of raising the funds, which implies that they would be generated through discretionary allocations from national budgets rather than an automatic method. Like Norway, the G77 and China interpret the polluter pays principle as meaning that only developed countries provide the funding, and only developing countries receive it. However, the proposal does not explicitly give priority to the most vulnerable countries or communities in disbursing funds for adaptation. The proposal endorses many of the other governance principles listed in Section 4.1, including balanced representation of donor and recipient countries in managing funds, transparency, equity and reflecting the priorities of recipient countries. By setting the financing requirement at 0.5 to 1 per cent of GNP, this proposal would provide the most substantial level of financing of the five reviewed here.[90]

5. Canada's Role

5.1 The Canadian Context

Canada has not proposed a financing approach of its own, and its submissions to the UN negotiating process have not made specific comments on other countries' proposals. At the UN climate negotiations in Poznan, Poland in December 2008, Canada tabled a submission that made three comments about financing:

- "Mobilizing and leveraging private sector investment will be paramount," and the global carbon market should play a "key role," provided that its market mechanisms meet "a high standard of environmental integrity."
- "Adequate, predictable and sustainable financial support" is necessary to "build the capacity of the poorest and most vulnerable countries to adapt to the impacts of climate change."
- Countries should work to "maximize the effectiveness of existing international financial mechanisms and institutions" for adaptation, mitigation, and clean technology deployment.[91]

Notably absent from these statements is any commitment on Canada's part to new financial contributions. The language of "adequate, predictable and sustainable" financing repeats the Bali Action Plan, but that plan applies those principles to new financing for mitigation, adaptation, technology cooperation and capacity-building. In contrast, Canada's submission seeks to make maximum use of the "existing" sources of funding to cover those broad categories, and restricts the discussion of "adequate" support to the much narrower category of capacity building for adaptation.

Canada's previous comments on this issue appeared in a submission to the UN negotiation process made in March 2008. There, Canada stated that "it will not be possible to successfully address" the question of financial support "without an understanding of what will be the measurable and verifiable emission reduction commitments by major emitters, including the emerging economies."[92] In other words, the Government of Canada wants to see developing countries make new commitments to mitigation before it would be willing to consider a new commitment on financing. Given the expectation that developed countries will show leadership in tackling climate change, this approach is unlikely to be viewed as constructive by other negotiators.

In recent years, Canada has faced sustained and public criticism for positions it has adopted at the UN climate negotiations. In Bali in 2007, Canada was singled out for its resistance to science-based emission targets, its decision not to attempt to meet its own Kyoto Protocol target, and its position that developing countries must adopt binding absolute emission reduction targets of their own.[93] Canada's recent statements on the question of financing fall into the pattern that has produced strong critiques from UN officials and other negotiators in recent years.

This is all the more unfortunate in light of the fact that Canada has, in the past, been recognized for taking a leadership role in contributing to climate finance. In 2001, Canada became the first

> "The Conference of Parties.... Welcomes the intention expressed by Canada to contribute C$10 million, to enable the prompt start of this fund."
>
> *— Conference of Parties to the UNFCCC, November 2001*[96]

donor to the Least Developed Countries Fund, a fund created by the UNFCCC to begin addressing the adaptation needs of the world's least developed countries (LDCs). This fund has allowed 48 countries to prepare action plans that itemize their most urgent adaptation needs. The fund is now looking for pledges totalling US$500M to implement these plans, which are known as "national adaptation plans of action" (NAPAs).[94] However, the demand far exceeds the US$500M that the fund is seeking, as the LDCs themselves have identified over US$1.5B in urgent adaptation needs through their NAPAs.[95]

Canada has contributed just over C$240M to climate adaptation since 2000, mainly through its international development agency, CIDA.[97] Although these contributions are counted as ODA and represent a small fraction of the need, this track record is nonetheless an important foundation that can be built on. The contributions include:

- C$11M to the Special Climate Change Fund under the Global Environmental Facility, which currently operates as the financial mechanism of the UNFCCC.
- C$10M to the Least Developed Countries Fund (pledged in 2001, as noted above). The LDCF is also managed by the Global Environmental Facility.
- C$56M to the Global Environmental Facility's trust fund replenishment. Climate change is one of the trust fund's priorities.
- C$21.4M for bilateral projects in vulnerable countries (including Nigeria, Jamaica, Bangladesh, El Salvador, India, the South Pacific region, and Vietnam).
- C$85M in 2008 to the World Bank's Pilot Program for Climate Resilience.[98]

Several of the adaptation efforts on this list were funded through a C$100M Canada Climate Change Development Fund (CCCDF), which was established in 2000. The fund's objective was to "promote activities addressing the causes and effects of climate change in developing countries." The fund was extended for one year beyond its original five-year term, but was not renewed after March 31, 2006. Canada's leadership contribution to the Least Developed Countries Fund came from this source.[99]

CIDA's 2004 mid-term evaluation of the CCCDF makes very interesting reading in preparation for this year's financing negotiations, as the evaluators produced a glowing review of the fund. The evaluation notes that:

- "By all accounts the Fund has been a tremendous contribution to Canada's UNFCCC negotiations."
- "The Fund has raised Canada's profile at the negotiations and enhanced its standing with developing countries. The goodwill generated is considered to be of high strategic value to Canada's negotiating position."
- "The fund distinguished Canada as the first country to take action to meet the commitments to developing countries established under the UNFCCC."
- "Universally, developing country partners are appreciative of the Funds [sic] contribution to increasing their capacity to participate in the UNFCCC negotiations."

- "Though the evaluators agree with the need to support adaptation in developing countries, we urge that care be taken to avoid sending a message that adaptation support in any way relieves Canada of its domestic obligation to act decisively to mitigate the release of GHGs in the atmosphere."
- "There has been a high level of participation in the Fund of the developing world's largest greenhouse gas (GHG) emitters."
- "There have been substantial opportunities for Canadian companies, with 40% of projects having private sector involvement."
- "The CCCDF has given Canada a head start in terms of a development and climate change agenda."
- "The Fund has enhanced Canada's reputation."[100]

Through an Access to Information request, the Pembina Institute obtained a briefing note from the Department of Foreign Affairs summarizing Canada's international adaptation efforts. The note is not dated, but it is relatively recent as it includes funding contributions made public in the fall of 2008. The note acknowledges the need for financing in language that is significantly stronger than the positions Canada took in public in 2008. For example, the briefing note states that the costs of adaptation, "although difficult to fully predict, are estimated to be extremely high (estimates range from [C]$10–50 billion/year). While the figures vary, all agree that addressing adaptation *now* is more affordable than the costs of inaction."[101] And while Canada has publicly called for making maximum use of the existing sources of funding without committing to new contributions, the briefing note acknowledges that "[t]he UNFCCC funds established to help respond to funding obligations are widely criticized as being under-funded."[102]

5.2 Canada's Contribution

The CIDA evaluation cited above shows that Canada's government has obtained important benefits in the past by providing financial support for climate action, not to mention the benefits obtained by the recipients. Canada now has a narrow window of opportunity to contribute to a successful outcome in Copenhagen. For the issue of finance, seizing that opportunity will mean accepting the magnitude of financing required and committing to contribute our fair share.

Table 1. Canada's GHG emissions and GDP

Indicator	Canada	Global	Canada's Rank
GHG Emissions 2005 (Mt CO_2e)[103]	734[104]	2.28% of global	8th
Per Capita Emissions (tonnes of CO_2e/person)	22.6 (2005)	3.9 (2000)	8th
Cumulative Emissions, 1950-2000 (Mt CO_2e)	22,642	2.07% of global	10th
GDP 2007 (current international dollars)[105]	1.2 trillion	1.92% of global	14th

As discussed, it's not possible to say definitively what the costs of mitigation (including technology cooperation) and adaptation will be. But the available estimates indicate a potential need in the range of tens, even hundreds, of billions of dollars per year.

The next step is determining Canada's share of the global total. Some of the proposals on the table at the UN negotiations have done that already:

- A 2 per cent auction of Canada's AAUs, as proposed by Norway, would raise about C$300M per year by 2020, at carbon prices of US$20–25 per tonne.
- Switzerland calculates that Canada's contribution to the Multilateral Adaptation Fund would be C$900M per year.
- The G77 and China's proposal foresees contributions of 0.5 to 1 per cent of developed countries' GNP, also known as Gross National Income (GNI).[106] In Canada, that would mean a contribution of about C$9–18B per year, based on our 2007 GNI.[107]

Another method of calculating Canada's share is alluded to in Mexico's proposal, which lays out a set of indicators to assess countries' responsibility for climate change and their ability to pay. Countries frequently make "assessed contributions" to global institutions; these are contributions based on a formula that includes a country's wealth and other relevant metrics. The dues that countries pay to the UN are likely the best-known example of an assessed contribution.

In the context of climate change, Canada's assessed contribution to the Montreal Protocol's Multilateral Fund and to the Global Environmental Facility — two existing sources of international environmental finance — are very relevant assessment approaches. Two NGOs have also developed detailed formulas for sharing the global effort of financing climate change between countries. Oxfam's "Adaptation Financing Index" and the Greenhouse Development Rights framework's "Responsibility and Capacity Indicator" use two approaches to calculating countries' fair share of the effort. As its title implies, Oxfam only applies its approach to adaptation.

These five assessment methods (UN dues, Montreal Protocol, Global Environmental Facility, Oxfam and Greenhouse Development Rights) differ in their weighting of criteria and the range of countries included. Some share the effort among only the world's richest countries, while

others include all countries. Canada's share under these assessment formulas ranges from a high of 4.3 per cent from Oxfam and the GEF to a low of 2.7 per cent from the Greenhouse Development Rights framework. The average of the five produces an indicative "average assessed contribution" for Canada of 3.4 per cent of the global effort.

Multiplying this indicator by both low and higher estimates of the public finance needed for mitigation and adaptation produces a range for Canada's financial contribution of C$2.2B to C$5.7B per year, with the midpoint of that range being C$4.0B/year. Details and assumptions for these calculations are provided in Appendix A.

This is only a preliminary assessment intended to provide the order of magnitude of Canada's share of climate financing, but it does allow us to draw some comparisons:

- The low-end estimate (C$2.2B/year) is less than the C$2.7B that Canada spent on loans to bail out the auto sector in 2009.[108]
- The average estimate (C$4.0B/year) is less than the government's 1 per cent cut to the GST in the 2006 budget, which costs C$5.2B/year.[109]
- The G77 and China's assessment of 0.5 per cent of GNP produces a Canadian contribution of about C$9B/year. Canada has spent the same amount — a total of C$9B from 2001 to 2011 — on the military portion of the mission to Afghanistan.[110] It is also less than the annual cost of the total GST cut implemented by the Government of Canada (including the second percentage cut to the GST announced in October 2007).[111]
- Even the higher value from the G77 and China (1 per cent of GNI) would mean less than C$550/person for each Canadian.

However, if countries agree on an innovative means of raising the financing required, it is possible that Canada's contribution may not come entirely (or even partially) from our national budget. Instead, Canada could provide its fair share by, for example, auctioning emission allowances in a cap and trade system and supporting a levy on international aviation and shipping.

Fact Box 4: Financing Q&A

This box offers answers to some frequently asked questions about climate finance.

We're in a financial crisis. How can we afford new financial commitments?

The Copenhagen negotiations are about the years after 2012, when the first Kyoto Protocol commitment period ends. As the UNFCCC's analysis noted in November 2008, "in relation to the long-term nature of climate change and the action required to address it, the financial and economic crises are short-term issues."[112] In fact, the financial crisis has helped make the case for climate financing, by demonstrating that governments are capable of mobilizing very large amounts of finance very quickly in response to a significant threat.

China has a space program and a massive economy. Why do they need any support?

Thanks to its high per capita emissions, Canada has made a significant contribution to the GHG pollution that's causing climate change. Under the UNFCCC, and because of the polluter pays principle, we have an obligation to help developing countries cope with the consequences of our actions. It is worth noting that, despite its rapid industrialization, China's per-capita GHG emissions were four times lower than Canada's in 2005,[113] and China's per-capita GDP in 2007 was seven times lower than Canada's.[114] China is already taking action to unilaterally reduce its emissions, but it could do more with support from richer countries. Finally, Canada's international development agency continues to fund programs in China, committing C$37M to governance and environmental activities in 2006–07. CIDA notes that this investment is "of strategic importance to Canada" and "a tangible expression of Canadian values."[115]

Canada just committed $85M to climate adaptation through the World Bank. Do we need to do more?

The short answer is yes. A one-off commitment to the World Bank's Pilot Program for Climate Resilience does not align with the principles of "adequate, predictable and sustainable" financing that are laid out in the Bali Action Plan. In fact, the World Bank's Climate Investment Funds (which includes the pilot program Canada contributed to) have a sunset clause "in order not to prejudice UNFCCC deliberations regarding the future of the climate regime" — so Canada's pledge is not intended for the post-2012 years.[116] In addition, the UN process is widely viewed as being more equitable than the World Bank; many NGOs also question the World Bank's track record of investment, citing a perceived preference for fossil fuel investments over renewable energy and energy efficiency technologies.

How can Canada take a position on this issue until we know where the U.S. stands?

Canadians know that we can show leadership in North America despite our smaller size relative to the U.S. (In fact, Canada pledged C$10M to the UNFCCC's Least Developed Countries Fund in 2001, while President Obama made the first U.S. pledge to that fund — for US $10M — this year.) It's clear that President Obama is taking this issue extremely seriously and wants to see the U.S. play a leading role. President Obama's climate envoy, Todd Stern, has already recognized the importance of financing, stating that "the United States and other developed countries will need to join together to establish mechanisms ensuring a significant flow of funds to developing countries, especially the most vulnerable ones."[117]

5.3 Recommendations

Canada has a long way to go on climate financing. Despite successful forays into support for adaptation (using ODA funding) in the past, Canada has not yet recognized the scale of financial resources needed to avoid dangerous climate change or accepted the part that we must play in securing new public resources for some of the world's most vulnerable people.

To play a constructive role in securing a new global climate deal in Copenhagen at the end of the year, Canada needs to change course with urgency. The UN climate negotiations resume in June, and G8 leaders will meet in July at a summit where climate change is expected to feature prominently on the agenda. In advance of those meetings, Canada should:

- Acknowledge that the scale of public contribution needed globally runs into the tens of billions of dollars per year.
- Commit to providing Canada's fair share of that need. Assessed contribution formulas show that a responsible contribution from Canada to climate finance in developing countries is approximately 3 to 4 per cent of the total global finance that government will provide in the Copenhagen agreement and beyond.
- Offer a substantive response to the numerous proposals for innovative and conventional finance that other countries have brought to the negotiating table.
- As a "downpayment" on the Copenhagen agreement, fund our fair share of the most urgent adaptation needs identified by Least Developed Countries in their NAPAs, which total US$1.5B. Based on Canada's assessed contribution,[118] our share of meeting those needs is about C$83M. This would also help to build goodwill in advance of the 2010 G8 Leaders' Summit, which Canada will host in Hunstville, Ontario.

In Copenhagen, Canada should support a mechanism for climate finance that is demonstrably capable of providing scaled-up, predictable, effective and sustainable funding to developing countries for mitigation, adaptation, technology cooperation and capacity-building. Canada should also commit to providing its fair share of finance under that mechanism, in line with the share of effort outlined above.

Of course, finance is just one of the Bali building blocks. To play a responsible part in preventing dangerous climate change, Canada must also accept a national target under the Copenhagen agreement that aligns with scientific assessments of the emission reductions needed to stay below 2°C of global average warming. This means a target for Canada to reduce its net emissions to at least 25 per cent below the 1990 level in 2020.[119]

None of this will be easy, but it's necessary. Vulnerable people around the world need protection from the consequences of the pollution we have released. Developing countries need support in reducing their emissions so that the world can avoid climate catastrophe. And deep emission cuts at home are the foundation that can allow Canada to regain credibility at the international climate talks.

The good news is that Canadians are already onboard. In a November 2008 poll, 68 per cent of Canadians surveyed agreed with the statement that "the world's richest countries, including Canada, should provide sufficient financial aid to allow developing countries to cope with global warming."[120] Canada's government has the opportunity in Copenhagen to show Canadians the climate leadership that they clearly want to see.

Appendices

Appendix A: Canada's Share of the Total Financing Requirement

This Appendix calculates Canada's share of the financing requirement in developing countries using several methods.

Table 2. Canada's share using assessed contribution methods of calculation

Estimated need for public finance in developing countries (mitigation and adaptation)		Total: low estimate (C$B)	Total: high estimate (C$B)
Assessment	Canada's share (%)		
		66.2	167.8
GEF "basic share" (2006)[121]	4.28	2.8	7.2
UN assessed contribution (2006–2007)[122]	2.813	1.9	4.7
Greenhouse Development Rights (2009)[123]	2.7	1.8	4.5
Montreal Protocol (2006–08)[124]	2.798	1.9	4.7
Oxfam 2007[125]	4.3	2.8	7.2
			2.8[a]
Average[b]	3.4	2.2	5.7
		4.0	

[a] Using Oxfam's own estimate of global adaptation needs (US$50B), and calculating adaptation needs only.

[b] Excluding the C$2.8B estimate referred to in footnote a.

Notes and assumptions for Table 2

The high and low estimate of public finance needed in developing countries are derived as follows:

- For adaptation, the totals used here come from selecting the lowest and highest estimates of adaptation needs (World Bank and UNDP, respectively) from Appendix B: US$9B and US$86B. Adaptation funding was assumed to be 100% public funding.

- For mitigation, a figure of US$40B is selected. This is based on the developing countries' share of global investment and financial flows from the UNFCCC's 2007 and 2008 estimates (see Appendix B). The UNFCCC estimates a total of US$85–90B will be needed annually in developing countries in 2030.
- The UNFCCC's 2007 report also states that corporations are responsible for 60% of investments and financial flows worldwide; governments and households account for the remainder. To produce an estimate of public dollars needed in developing countries, the corporate share of expected financial flows was deducted, on the assumption that private companies in developing countries can contribute to reducing emissions, while households and governments will require support from developed countries. This led to an estimate of US$40B.

Table 3. Canada's share under various UNFCCC negotiation financing proposals

Proposal and areas to be financed	**Share of GNP**		**Canada's 2007 GNI (C$B)**		**Contribution (C$B)**
G77 and China (lower) — mitigation, adaptation, technology, R&D	0.5		18,153[126]		9.0
G77 and China (higher)	1		18,153		18.1
Norway — adaptation	**% of AAUs**	**Total AAUs in 2020 (Mt)**	**AAUs to be auctioned (Mt)**	**Price (US$/tonne)**	
Norway (using Government of Canada's estimation of target)[a]	2	577 [c]	11.5	20 [d]	0.3
Norway (using science-based emissions target)[b]	2	444	8.9	25	0.3
Swiss — adaptation	**Tax rate (US$)**	**Tax collected in Canada in 2010 (US$B)**	**Canadian contribution to Multilateral Adaptation Fund (US$B)**		
Swiss[e]	2	1.224	0.734		0.9

[a] 20% below the 2006 emission level in 2020

[b] 25% below the 1990 emission level in 2020

[c] Canada's 2006 emissions were 721 Mt CO_2e, and 1990 emissions were 592 Mt CO2e.[127]

[d] Higher and lower carbon prices taken from *UNFCCC, Investment and financial flows to address climate change: an update (Technical Paper), November 2008,* 66–67. The higher price level for the science-based target corresponds to a greater global demand for emission allowances if all countries adopt more stringent targets.

[e] All data from the Swiss proposal, FCCC/AWGLCA/2008/MISC.5, 94. Under Switzerland's proposal, developed countries divide the funds raised through the carbon tax between contributions to the Multilateral Adaptation Fund and domestic National Climate Change Funds.

Appendix B: Financing Estimates for Mitigation and Adaptation

Table 4. Additional investment and financial flows needed for mitigation in 2030 by sector, according to the UNFCCC[128]

Sector	Areas/mitigation measures considered	Global cost (2005 US$B)	Amount needed in developing countries
Fossil fuel supply	Lower production due to reduced demand and greater use of biofuels	-59	54%
Power supply	Lower fossil-fired generation capacity More renewables Carbon dioxide capture and storage Nuclear energy Hydropower	-7	49%
Industry	Greater energy efficiency Carbon dioxide capture and storage Reduced emissions of non-CO_2 gases	36	54%
Buildings	Greater energy efficiency	51	28%
Transportation	More fuel-efficient vehicles Greater use of biofuels	88	40%
Waste	Capture and use of methane from landfills and wastewater plants	1	64%
Agriculture	Reduced methane emissions from crops and livestock	35	37%
Forestry	Reduced deforestation and forest degradation Sustainable forest management	21	99%
Technology research, development and deployment	Double the amount that is currently spent in this area	35–45	-
Total net additional investment (2005 US$B)		**200–210**	**85–90**

Table 5. Additional investment and financial flows needed for adaptation in 2030 by sector, according to the UNFCCC[129]

Sector	Areas/adaptation measures considered	Global cost (2005 US$B)	Amount needed in developing countries
Agriculture, forestry and fisheries	Production and processing, research and development, extension activities	14	50%
Water supply	Water supply infrastructure	11	80%
Human health	Treating increased cases of diarrhoeal disease, malnutrition and malaria	5	100%
Coastal zones	Beach nourishment and dykes	11	45%
Infrastructure	New infrastructure	8–130	25%
Total net additional investment (2005 US$B)		**49–171**	**28–58**

Table 6. Comparison of estimates for adaptation financing needed in developing countries

Source	Estimate (US$B)	Date to which estimate applies	Currency vintage	Converted to today's C$B
World Bank – low[130]	9	not specified	2000	14.7
World Bank – high	41	not specified	2000	66.9
Oxfam[131]	50	not specified	2007 [a]	67.6
UNDP[132]	86	2015	2007 [a]	116.3
UNFCCC – low[133]	27.8	2030	2005	39.7
UNFCCC – high	58.2	2030	2005	83.3
Average of estimates				**64.7**

[a] Currency vintage not specified; assumed that the currencies were as of the date of publication of these reports. Currencies were compared using U.S. Government GDP deflators found at http://www.gpoaccess.gov/usbudget/fy09/sheets/hist10z1.xls.

Appendix C: The Legal Obligation to Finance Climate Action

This appendix includes a selection of legal texts that create a legal obligation for Canada to provide financial support for climate action in developing countries.

United Nations Framework Convention on Climate Change (UNFCCC): Preamble

"Noting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs,"

UNFCCC, Article 4

"3. The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1 [preparation of a national inventory report of GHG emissions and a general description of steps taken or envisaged to implement the convention]. They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article[134] and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article. The implementation of these commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among the developed country Parties.

4. The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects.

7. The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties."

Kyoto Protocol, Article 11

"In the context of the implementation of Article 4, paragraph 1, of the Convention, in accordance with the provisions of Article 4, paragraph 3, and Article 11 of the Convention, and through the entity or entities entrusted with the operation of the financial mechanism of the Convention, the developed country Parties and other developed Parties included in Annex II to the Convention shall:

(a) Provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in advancing the implementation of existing commitments under

Article 4, paragraph 1 (a) [preparation of national inventories], of the Convention that are covered in Article 10, subparagraph (a) [preparation of national inventories]; and

(b) Also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of advancing the implementation of existing commitments under Article 4, paragraph 1,[135] of the Convention that are covered by Article 10 and that are agreed between a developing country Party and the international entity or entities referred to in Article 11 of the Convention, in accordance with that Article.

The implementation of these existing commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among developed country Parties."

Bali Action Plan

"1. Decides to launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision at its fifteenth session [to be held in Copenhagen in December 2009], by addressing, inter alia: [...]

(b) Enhanced national/international action on mitigation of climate change, including, inter alia, consideration of:

(i) Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances;

(ii) Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner;

(e) Enhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation, including, inter alia, consideration of:

(i) Improved access to adequate, predictable and sustainable financial resources and financial and technical support, and the provision of new and additional resources, including official and concessional funding for developing country Parties;

(ii) Positive incentives for developing country Parties for the enhanced implementation of national mitigation strategies and adaptation action;

(iii) Innovative means of funding to assist developing country Parties that are particularly vulnerable to the adverse impacts of climate change in meeting the cost of adaptation;

(iv) Means to incentivize the implementation of adaptation actions on the basis of sustainable development policies;

(v) Mobilization of public- and private-sector funding and investment, including facilitation of carbon-friendly investment choices;

(vi) Financial and technical support for capacity-building in the assessment of the costs of adaptation in developing countries, in particular the most vulnerable ones, to aid in determining their financial needs;"

Appendix D: Current International Support for Adaptation

Table 7. Overview of current and pledged financial resources for adaptation in developing countries[136]

Source	Estimated level of funding (US$M)	Period	Nominal annual level of funding
Funding under the UNFCCC			
Strategic Priority on Adaptation	50	GEF 3–GEF 4[137]	-
Least Developed Countries Fund	172	As of October 21 2008	NA
Special Climate Change Fund	91	As of October 21 2008	NA
Adaptation Fund	400–1,500	2008–2012	80–300
	91	As of October 31 2008	
Multilateral Initiatives			
Pilot Programme for Climate Resilience (World Bank)	240	2009–2012	60
Global Facility for Disaster Reduction and Recovery	11	2007–2008	5.5
Bilateral Initiatives			
Cool Earth Partnership (Japan)	1,000	2008–2012	200
International Climate Initiative (Germany)	200	2008–2012	40
Global Climate Change Alliance (European Commission)	84	2008–2010	28
UNDP-Spain Millennium Development Goals Achievement Fund	22	2008–2012	5.5
Total (C$B)			**3.0–4.4**

Endnotes

[1] All conversions to Canadian dollars in this report used exchange rates of US $1=C$1.2877(as of March 5, 2009) and €1=C$1.6609 (as of April 6, 2009), using the Bank of Canada's Currency Converter.

[2] Marthinus van Schalkwyk (South African Minister of Environmental Affairs and Tourism), *Keynote Address on Emerging Strategies for International Climate and Investment Policy* (Washington, D.C.: January 13, 2009.) Also available online at http://www.cap.org.za/view.asp?ItemID=32&tname=tblComponent1&oname=&flt=&pg=front.

[3] Between 1850 and 2000, industrialized countries accounted for 78% of global cumulative carbon dioxide emissions from burning fossil fuels. Between 1950 and 2000, industrialized countries accounted for 53% of global cumulative carbon dioxide emissions from burning fossil fuels and deforestation. See *Climate Analysis Indicators Tool (CAIT) Version 5.0* (Washington, DC: World Resources Institute, 2008), http://cait.wri.org/.

[4] FCCC/CP/2007/6/Add.1, Paragraph 1(e). Also available online at http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3.

[5] John Vidal, "Rich Nations Failing to Meet Climate Aid Pledges," The Guardian, February 20, 2009. Also available online at http://www.guardian.co.uk/environment/2009/feb/20/climate-funds-developing-nations (accessed April 12, 2009).

[6] UNFCCC, Article 4 (7). Also available online at http://unfccc.int/resource/docs/convkp/conveng.pdf.

[7] Organization for Economic Co-operation and Development (OECD), *Environmental Principles and Concepts — OCDE/GD(95)124* (Paris, France: OECD, 1995), 7–13. Also available online at http://www.olis.oecd.org/olis/1995doc.nsf/LinkTo/NT00000C96/$FILE/11E50299.PDF.

[8] The average temperature increase to date (1850–1899 to 2001–2005) is 0.76°C; and the mid-range estimate for average warming between 1980–99 and 2090–99, if GHG concentrations remain at the year 2000 level, is 0.6°C. See IPCC, "Summary for Policymakers," in S. Solomon et al, eds., Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, UK and New York, NY: 2007), 5, 13. Also available online at http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf.

[9] IPCC, "Summary for Policymakers," in M.L. Parry et al., eds., Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, UK, and New York, NY: 2007), 13. Also available online at http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf.

[10] Kevin Watkins, *Human Development Report 2007/2008, Fighting Climate Change: Human Solidarity in a Divided World* (New York, NY: United Nations Human Development Programme, 2007), 176. Also available online at http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf.

[11] Ian Burton, Elliot Diringer and Joel Smith, *Adaptation to Climate Change: International Policy Options* (Arlington, VA.: Pew Centre on Global Climate Change, 2006), 1. Also available online at http://www.pewclimate.org/docUploads/PEW_Adaptation.pdf.

[12] Cited in World Health Organization, *Protecting Health from Climate Change: World Health Day 2008* (Geneva, Switzerland: World Health Organization, 2008), 19. Also available online at http://www.who.int/world-health-day/toolkit/report_web.pdf.

[13] Ochieng Rapuro, "Adaptation is...Predicting Malaria's Changing Course in East Africa," fact sheet (Ottawa, ON: International Development Research Centre, no date given), 2.

[14] Shyam Saran, "Questions and Answers on India's Position on Climate Change Issues," fact sheet (India: Special Envoy of the Prime Minister for Climate Change, 2009), 4.

[15] World Health Organization, 2.

[16] Watkins, 78.

[17] Ibid., p. 78–80.

[18] Ibid, p. 76.

[19] Burton et al, 3.

[20] Kate Raworth, *Adapting to Climate Change: What's needed in poor countries, and who should pay* (Oxford, U.K.: Oxfam International, 2007), 17. Also available online at http://www.oxfam.org/sites/www.oxfam.org/files/adapting%20to%20climate%20change.pdf. See also Burton, Diringer and Smith, 1.

[21] FCCC/AWGLCA/2008/MISC.2/Add.1, 42 (Government of Switzerland, Submission to the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention: Funding Scheme for the Bali Action Plan, August 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca3/eng/misc02a01.pdf.

[22] International Strategy for Disaster Reduction, "*Climate Change and Disaster Risk Reduction," fact sheet (Briefing Note 01),* (Geneva, Switzerland: United Nations International Strategy for Disaster Reduction, 2008).

[23] Ibid., 9. See also IPCC "Technical Summary" in M.L. Parry et al, eds., Climate Change 2007: The Physical Science Basis. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, UK and New York, NY: 2007), 40, on the cost savings from adaptation actions in coastal areas. Also available online at http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-ts.pdf.

[24] Watkins, 147.

[25] OECD Stat Extracts, *ODA by Donor,* Organization for Economic Development and Cooperation, http://stats.oecd.org/wbos/Index.aspx?DatasetCode=ODA_DONOR (accessed April 4, 2009).

[26] United Nations Framework Convention on Climate Change (UNFCCC), *Investment and Financial Flows to Address Climate Change* (Bonn, Germany: UNFCCC, 2007), 108. Also available online at http://unfccc.int/files/cooperation_and_support/financial_mechanism/application/pdf/background_paper.pdf.

[27] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper*, November 2008, 49.

[28] Sir Nicholas Stern, *Stern Review: The Economics of Climate Change — Executive Summary* (London, U.K.: HM Treasury, 2006), xxvi. Also available online at http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf.

[29] These estimates cover a range of years, from not being specific (Oxfam, World Bank) to 2015 (UNDP) and 2030 (UNFCCC). See Table 6 for a comparison of adaptation estimates that includes timescales.

[30] Raworth, 22.

[31] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper*, November 2008, 19.

[32] For example, a government could require developers to adhere to a building code that factors in climate change.

[33] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* , 34.

[34] FCCC/AWGLCA/2008/MISC.5, 94 (Government of Switzerland, Funding Scheme for the Bali Action Plan: A Swiss Proposal for Global Solidarity in Financing Adaptation, October 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca4/eng/misc05.pdf.

[35] Todd Stern (U.S. Special Envoy for Climate Change), Keynote Remarks at U.S. Climate Action Symposium (Washington D.C., March 3, 2009). Also available online at http://www.state.gov/g/oes/rls/remarks/2009/119983.htm.

[36] IPCC, "Summary for Policymakers," in B. Metz et al., eds., Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, UK, and New York, NY: 2007), 18. Also available online at http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf. The stabilization range is 445–535 parts per million (ppm) CO_2e in 2050. The lower end of that range is likely to be consistent with a global average temperature increase of 2°C, relative to the pre-industrial level.

[37] McKinsey & Company, *Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve* (no location specified: McKinsey & Company, 2009), 8. Also available online at http://www.mckinsey.com/globalGHGcostcurve.

[38] UNFCCC *Investment and Financial Flows to Address Climate Change* (2007), 1.

[39] UNFCCC *Investment and Financial Flows to Address Climate Change* (2007), 216 — Annex V, Table 5: Total Emissions by Sectors and Years Under the Reference and Mitigation Scenario.

[40] Meinshausen 2007, reproduced in Watkins, 49 (Figure 1.11, "Halving Emissions by 2050 Could Avoid Dangerous Climate Change"). It should be noted that more recent scientific assessments have shown that even greater emission reductions may be necessary in order to avoid dangerous climate change. See, for example, Joel B. Smith et al, "Assessing Dangerous Climate Change Through an Update of the Intergovernmental Panel on Climate Change (IPCC) 'Reasons for Concern'," *Proceedings of the National Academy of Science of the United States,* February 26, 2009. Also available online in PNAS Early Edition at www.pnas.org/cgi/doi/10.1073/pnas.0812355106.

[41] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 18. The UNFCCC's 2008 update also notes that "higher capital costs for energy supply facilities" resulted in a 170 per cent increase in the total additional costs needed to reduce energy-related CO_2 emissions, relative to the 2007 report. That increased cost is not reflected in these estimates, for two reasons: the UNFCCC does not provide an estimate with the updated total costs, and those capital costs way well have changed again due to the current economic downturn.

[42] UNFCCC *Investment and Financial Flows to Address Climate Change* (2007), 31.

[43] Stern 2006, x, xii.

[44] Arno Behrens, *Financial Impacts of Climate Change: What Scale of Required Resources?* [version: as of 22 September 2008] (Brussels, Belgium: Centre for European Policy Studies, 2008), 1.

[45] van Schalkwyk, 2009. Also available online at http://www.cap.org.za/view.asp?ItemID=32&tname=tblComponent1&oname=&flt=&pg=front.

[46] Saleemul Huq and Jessica Ayers, "Critical List: The 100 Nations Most Vulnerable to Climate Change," fact sheet (Sustainable Development Opinion 2007), (London, U.K.: International Institute for Environment and Development, 2007), 1. Also available online at http://www.iied.org/pubs/pdfs/17022IIED.pdf.

[47] South African Department of Environment and Tourism, *Government's Vision, Strategic Direction and Framework for Climate Policy* (Powerpoint Presentation to the National Climate Change Summit, Gauteng, South Africa, March 3–6, 2009). Also available online by clicking the "Government's Directions for the National Climate Change Response Policy at http://www.ccsummit2009.co.za/index.html (accessed April 12, 2009).

[48] Center for Clean Air Policy, *Greenhouse Gas Mitigation in China, Brazil and Mexico: Recent Efforts and Implications* (Washington, D.C.: Center for Clean Air Policy, 2007), 3–10 and 14–17. Also available online at http://www.ccap.org/docs/resources/64/Developing_Country_Unilateral_Actions_2007_Update.pdf.

[49] Valerie Volcovici, "Mexico Considers Domestic Cap and Trade," *Point Carbon*, March 16, 2009. Also available online (subscription required) from http://www.pointcarbon.com/.

[50] Barbara A. Finamore, Natural Resources Defense Council, Testimony before the Select Committee on Energy Independence and Global Warming of the U.S. House of Representatives, March 4, 2009.

[51] Government of China, *White Paper: China's Policies and Actions on Climate Change* (Government of China, 2008). Also available online at http://www.china.org.cn/government/news/2008-10/29/content_16681689.htm.

[52] Transport Canada, *Background Paper for the Development of Motor Vehicle Fuel Consumption Regulations* (Ottawa, ON: Government of Canada, 2008), 20 (Figure 1). Also available online at http://www.tc.gc.ca/pol/en/environment/FuelConsumption//pdf/BackgroundPaper.pdf.

[53] This holds true whether the "re-labelling" is of existing ODA or existing commitments to increase ODA contributions in those countries that have not yet reached the historical UN target of 0.7% of Gross National Income (GNI) for ODA. In 2008, Canada contributed 0.32% of its GNI to ODA, according to the OECD database at http://stats.oecd.org/wbos/Index.aspx?DatasetCode=ODA_DONOR (accessed April 4, 2009).

[54] Raworth, 12.

[55] FCCC/CP/2007/6/Add.1, Paragraphs 1(b)(i) and 1(b)(ii).

[56] FCCC/AWGLCA/2009/MISC.1, 68 (Republic of Korea, A Proposal for AWG-LCA, February 2009, For Mitigation: A Registry of NAMAs, February 2009). Also available online at http://unfccc.int/resource/docs/2009/awglca5/eng/misc01.pdf.

[57] Brian Tomlinson, Program Officer (Aid), Canadian Council for International Co-operation, email communication, March 26, 2009.

[58] In this document, the word "carbon" is a shorthand expression that includes all six of the greenhouse gases covered by the Kyoto Protocol (of which carbon dioxide is the largest component). The abbreviation "CO_2e" refers to "carbon dioxide equivalent," a standard measure which incorporates all six of these gases.

[59] Karan Capoor and Philippe Ambrosi, *State and Trends of the Carbon Market 2008* (Washington, D.C.: World Bank, 2008), 32. Also available online at http://wbcarbonfinance.org/docs/State_Trends_FINAL.pdf.

[60] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 64.

[61] UNFCCC, *Clean Development Mechanism (CDM) Home*, http://cdm.unfccc.int/index.html (accessed April 2, 2009).

[62] David Victor, *Global Warming Policy After Kyoto: Rethinking Engagement with Developing Countries* (Stanford, CA: Stanford University Program on Energy and Sustainable Development, 2009), 13. Also available online at http://iis-db.stanford.edu/pubs/22383/CAD_Working_Paper_82.pdf.

[63] See, for example, Council Conclusions on International Financing of Climate Change (Council of the European Union, 2931st Economic and Financial Affairs, Brussels, 10 March 2009), 3. Also available online at http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ecofin/106572.pdf.

[64] Sujata Gupta et al, *IPCC Fourth Assessment Report, Working Group III — Chapter 13: Policies, Instruments and Co-operative Arrangements* (Cambridge, UK, and New York, NY: 2007), 44 (Box 13.7). Also available online at http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter13.pdf.

[65] Benito Müller, *International Adaptation Finance: The Need for An Innovative and Strategic Approach* (Oxford, U.K.: Oxford Institute for Energy Studies, June 2008), 9–10.

[66] FCCC/KP/2008/L.7 (Draft decision -/CMP.4: Report of the Adaptation Fund Board, December 2008). Also available online at http://unfccc.int/resource/docs/2008/cmp4/eng/l07.pdf.

[67] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 37.

[68] United Nations Environment Programme Ozone Secretariat, *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer — 7th Edition (2006) — Annex V of the report of the Seventeenth Meeting of the Parties* (Nairobi, Kenya: United Nations Environment Programme, 2006). Also available online at http://ozone.unep.org/Publications/MP_Handbook/Section_3.7_Annexes_Finance/UN_scale_of_assessments.shtml.

[69] United Nations Environment Programme, *Backgrounder: Basic Facts and Data on the Science and Politics of Ozone Protection* (Nairobi, Kenya: United Nations Environment Programme, 2008), 10. Also available online at http://ozone.unep.org/Events/ozone_day_2008/press_backgrounder.pdf.

[70] United Nations Environment Programme Ozone Secretariat, *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer — 7th Edition (2006)*.

[71] Secretary-General of the United Nations, Secretary-General's Remarks at official launch of UNITAID, the International Drug Purchase Facility (New York, September 19, 2006). Also available online at http://www.un.org/apps/sg/sgstats.asp?nid=2212.

[72] UNITAID, *Annual Report 2007* (Geneva, Switzerland: World Health Organization, 2008), 35. Also available online at http://www.unitaid.eu/images/governance/annualreport2007.pdf.

[73] Ibid., 36.

[74] Ibid., 44.

[75] Ibid., 36.

[76] FCCC/CP/2007/6/Add.1, Paragraph 1(e)(i).

[77] Donald Pols, *Finance and Investment from Developed to Developing Countries: A Global Financial Architecture for Climate Change* (Netherlands: WWF, 2008). Also available online at http://assets.panda.org/downloads/wwf_finance_paper_web.pdf.

[78] "Towards a Global Climate Fund: Principles for Poznan and Beyond," declaration, http://www.choike.org/campaigns/camp.php?3 (accessed April 4, 2009).

[79] FCCC/AWGLCA/2008/MISC.2, 48 (Norway, Finance — AWGLCA, Norway's Submission on Auctioning Allowances, August 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca3/eng/misc02.pdf.

[80] Ibid., 48.

[81] FCCC/AWGLCA/2009/MISC.1, 59 (Maldives, on behalf of the Group of Least Developed Countries, International Air Passenger Adaptation Levy, December 2008). Also available online at http://unfccc.int/resource/docs/2009/awglca5/eng/misc01.pdf.

[82] Al Gore, "Moving Beyond Kyoto," *The New York Times,* July 1, 2007. Also available online at http://www.nytimes.com/2007/07/01/opinion/01gore.html (accessed April 12, 2009).

[83] FCCC/AWGLCA/2008/MISC.5, 94 (Government of Switzerland, Funding Scheme for the Bali Action Plan: A Swiss Proposal for Global Solidarity in Financing Adaptation, October 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca4/eng/misc05.pdf.

[84] Ibid., 97.

[85] FCCC/AWGLCA/2008/MISC.2, 40 (Government of Mexico, Enhanced Action on the Provision of Financial Resources and Investment to Support Action and Mitigation and Adaptation and Technology Cooperation, August 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca3/eng/misc02.pdf.

[86] FCCC/AWGLCA/2008/MISC.2/Add.1, 35 (Philippines on Behalf of the Group of 77 and China, Financial Mechanism for Meeting Financial Commitments Under the Convention, August 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca3/eng/misc02a01.pdf.

[87] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 13 (Table 3). The UNFCCC notes that "[o]wing to a lack of information on GNP, potential funding was calculated using GDP."

[88] Todd Stern, (U.S. Special Envoy for Climate Change), Prepared Opening Plenary Intervention, Opening Plenary Session of the Ad Hoc Working Group on Long Term Cooperative Action Under the Convention (AWG-LCA), Delegation of the United States of America, March 29, 2009. Also available online at http://germany.usembassy.gov/events/2009/mar-29-stern/#Plenary.

[89] Shyam Saran, "Questions and Answers on India's Position on Climate Change Issues," fact sheet (India: Special Envoy of the Prime Minister for Climate Change, 2009), 8.

[90] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 83 (Table 25).

[91] FCCC/AWGLCA/2008/Misc.5/Add.2 (Part I), 109 (Government of Canada, Ideas and Proposals on Paragraph 1 of the Bali Action Plan: Comments by Canada, December 2008). Also available online at http://unfccc.int/resource/docs/2008/awglca4/eng/misc05a02p01.pdf.

[92] FCCC/AWGLCA/2008/MISC.1/Add.2, 13 (Government of Canada, The Bali Action Plan: Views regarding the work programme for the Ad-Hoc Working Group on Long-term Cooperative Action under the Convention, March 2008). Also available online at

http://unfccc.int/resource/docs/2008/awglca1/eng/misc01a02.pdf.

[93] For a summary of Canada's positions, see Clare Demerse and Matthew Bramley, *UN Climate Negotiations in Poznan, Poland* (Drayton Valley, AB: The Pembina Institute, 2008). Also available online at http://pubs.pembina.org/reports/poznan-backgd-nov26.pdf. Critiques of Canada's position are noted in Matthew Bramley, "Canada and the Bali Roadmap," in *Behind the Headlines* (Toronto, ON: Canadian International Council, 2008). Also available online at http://pubs.pembina.org/reports/Op-ed-Canada-and-Bali.pdf.

[94] Global Environmental Facility, "The Least Developed Countries Fund (LDCF)," fact sheet (Washington, D.C.: Global Environmental Facility, 2008), 1. Also available online at http://www.gefweb.org/uploadedfiles/LDCF/LDCF_insert_LDCF.pdf.

[95] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 25.

[96] FCCC/CP/2001/13/Add.1. 2001. Decision 7/CP.7 (Report of the Conference of the Parties on Its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001, Addendum, Funding Under the Convention). Also available online at http://unfccc.int/resource/docs/cop7/13a01.pdf#page=43.

[97] Department of Foreign Affairs and International Trade briefing note entitled "International Adaptation" (Ottawa, ON: Government of Canada, undated). The Pembina Institute obtained this briefing note through an Access to Information request.

[98] Ibid.

[99] Canadian International Development Agency (CIDA), *Canada Climate Change Development Fund*, CIDA, http://www.acdi-cida.gc.ca/CIDAWEB/acdicida.nsf/En/JUD-4189500-J8U (accessed April 3, 2009).

[100] Canadian International Development Agency, *Canada Climate Change Development Fund Mid-Term Evaluation Final Report* (Gatineau, QC: CIDA, 2004), 1, 10. Available online at http://www.acdi-

cida.gc.ca/INET/IMAGES.NSF/vLUImages/Performancereview6/$file/CCCDF-English.pdf (accessed April 3, 2009).

[101] Department of Foreign Affairs and International Trade briefing note entitled "International Adaptation".

[102] Ibid.

[103] Data on global emissions, per capita emissions and cumulative emissions come from *Climate Analysis Indicators Tool (CAIT) Version 6.0*. (Washington, DC: World Resources Institute, 2009). Also available online at http://cait.wri.org/cait.php.

[104] Environment Canada 2008, 12 (Table S-3).

[105] International Monetary Fund, World Economic Outlook Database, 2008. The figure cited here is Canada's 2007 Gross Domestic Product using purchasing power parity in current international dollars.

[106] Gross National Product is now more commonly referred to as Gross National Income (GNI) in Canada.

[107] 2007 GNI of US$14097.3M is from OECD Stat Extracts, *ODA by Donor,* Organization for Economic Development and Cooperation, http://stats.oecd.org/wbos/Index.aspx?DatasetCode=ODA_DONOR (accessed April 13, 2009).

[108] Department of Finance Canada, *Canada's Economic Action Plan: Budget 2009* (Ottawa, ON: Department of Finance Canada, 2009), 30 (Table 1.2). Also available online at http://www.budget.gc.ca/2009/pdf/budget-planbugetaire-eng.pdf.

[109] Department of Finance Canada, *The Budget Plan 2006: Focusing on Priorities* (Ottawa, ON: Department of Finance Canada, 2006), 23 (Table 1.2). Also available online at http://www.fin.gc.ca/budget06/pdf/bp2006e.pdf.

[110] Government of Canada, *Cost of the Afghanistan Mission 2001–2011,* http://www.afghanistan.gc.ca/canada-afghanistan/news-nouvelles/2009/2009_02_25a.aspx?lang=eng (accessed April 13, 2009).

[111] Department of Finance Canada, Strong Leadership. A Better Canada: Economic Statement October 30 2007 (Ottawa, ON: Department of Finance Canada, 2007), 45 (Table 2.2). Also available online at http://www.fin.gc.ca/ec2007/pdf/EconomicStatement2007_E.pdf. The second percentage point cut to the GST cost C$6B in 2008–2009, which adds up to over C$11B when combined with the 2006 GST cut.

[112] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper*, November 2008, 15.

[113] Comparative GHG data are from *Climate Analysis Indicators Tool (CAIT) Version 6.0*. (Washington, DC: World Resources Institute, 2009). Also available online at http://cait.wri.org/cait.php.

[114] GDP data are from International Monetary Fund, World Economic Outlook Database 2008, 2008, http://www.imf.org/external/pubs/ft/weo/2008/01/weodata/weoselgr.aspx. GDP figures compared are for purchasing power parity and are expressed in current international dollars.

[115] Canadian International Development Agency, "China" webpage, http://www.acdi-cida.gc.ca/china (accessed April 12, 2009).

[116] World Bank Group, "Donors Pledge Over $6.1 Billion to Climate Investment Funds" news release, September 26, 2008. http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21916602~pagePK:34370~piPK:34424~theSitePK:4607,00.html.

[117] Todd Stern (U.S. Special Envoy for Climate Change), Keynote Remarks at U.S. Climate Action Symposium (Washington D.C., March 3, 2009).

[118] Canada's "Basic Share" of financing of the Global Environmental Facility's Trust Fund is 4.28% (see Appendix A).

[119] Pembina Institute et al, *Deep Reductions, Strong Growth* (Drayton Valley, AB: The Pembina Institute, 2008), 7–8. Also available online at http://pubs.pembina.org/reports/2020-prelim-full-e.pdf.

[120] The Pembina Institute et al., *McAllister Opinion Research Poll on Canadians' Opinions on Global Warming* (Drayton Valley, AB: The Pembina Institute, 2008). Also available online at http://pubs.pembina.org/reports/bg-polling-results-final.pdf

[121] Global Environmental Facility, *Attachment 1: Global Environmental Facility Trust Fund Fourth Replenishment of Resources, Table of Contributions* (Cape Town, South Africa: August 2006). Also available online at http://www.thegef.org/Documents/Council_Documents/GEF_29/documents/Updated_Replenishment_Table.pdf.

[122] ST/ADM/SER.B/668, *Assessment of Member States' Advances to the Working Capital Fund for the Biennium 2006–2007 and Contributions to the United Nations Regular Budget for 2006* (New York, NY: United Nations Secretariat, December 2005). Also available online at http://www.globalpolicy.org/finance/assessmt/dues2005.pdf.

[123] Sivan Kartha et al, *Canada's Role in a Climate Constrained World* (San Francisco, CA: EcoEquity and Stockholm Environmental Institute, 2009 (in draft).

[124] Montreal Protocol, Annex V of the *Report of the Seventeenth Meeting of the Parties (Adjusted UN scale with 22% maximum assessment rate considered)* (Nairobi, Kenya: United Nations Environment Programme, 2006). Also available online at http://ozone.unep.org/Publications/MP_Handbook/Section_3.7_Annexes_Finance/UN_scale_of_assessments.shtml. Note that this assessment applies for the period 2006 to 2008.

[125] Kate Raworth, *Adapting to Climate Change: What's needed in poor countries, and who should pay.* (Oxford, U.K.: Oxfam International, 2007), 28. Also available online at http://www.oxfam.org/sites/www.oxfam.org/files/adapting%20to%20climate%20change.pdf.

[126] Canada's 2007 GNI of US$14097.3M is taken from OECD Stat Extracts, *ODA by Donor*.

[127] Environment Canada, *National Inventory Report 1990–2006: Greenhouse Gas Sources and Sinks in Canada* (Ottawa, ON: Environment Canada, 2008), 12 (Table S-3). Also available online at http://www.ec.gc.ca/pdb/ghg/inventory_e.cfm.

[128] UNFCCC, *Investment and financial flows to address climate change: an update (Technical Paper),* November 2008, 18.

[129] UNFCCC, *Investment and financial flows to address climate change: an update (Technical Paper),* November 2008, 19.

[130] IMF and World Bank Development Committee, *Clean Energy and Development: Toward an Investment Framework (Annex K)* (Washington, D.C: World Bank Group, 2006), 143–144. Also available online at http://siteresources.worldbank.org/DEVCOMMINT/Documentation/20890696/DC2006-0002(E)-CleanEnergy.pdf.

[131] Raworth 2007, 3.

[132] Watkins 2007, 15.

[133] UNFCCC, *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 19.

[134] Article 4, Paragraph 1 includes national emission inventories, national mitigation programs, cooperation on technology transfer, conservation of sinks and reservoirs, cooperation in preparation for adaptation, taking climate change into account in relevant social, environmental and economic policies, promoting scientific research and cooperation, promoting research and education, and communication with the Conference of Parties.

[135] See note above.

[136] UNFCCC *Investment and Financial Flows to Address Climate Change: An Update — Technical Paper* (2008), 37.

[137] The Global Environmental Facility replenishes its funding on four-year cycles. The third replenishment (GEF-3) covered the period 2002–2006, while GEF-4 covers 2006–2010.