November 2009

BRIEFING NOTE

How to finance support for climate adaptation in vulnerable countries

Overview

Financial support for climate action in developing countries is a critical element of the international climate negotiations currently underway. A range of studies show that the needs are very significant: developing countries will require at least tens of billions of new public funding annually to adapt to climate changes that are already apparent.

The Government of Canada has committed to provide its fair share of the financing required. Calculations of effort-sharing and precedents from other international financing initiatives show a fair share for Canada is approximately 3 to 4 per cent of the global effort. Applying this to current estimates of the need indicates Canada's fair contribution to be $1-5 billion per year, over and above Official Development Assistance (ODA).

In light of Canada's current fiscal pressures, it may prove difficult to provide funding of this magnitude solely through the federal budget. This paper proposes an alternative means to raise the monies required through a federal cap-and-trade system, in which emissions allowances are auctioned and a portion of the proceeds dedicated to support climate adaptation in developing countries. The "Waxman-Markey" climate legislation passed in June 2009 by the U.S. House of Representatives takes this approach.

This paper calculates that, in an effective cap-and-trade system with full auctioning, less than 10% of the total allowance value would suffice to fulfill Canada's fair share commitment to support adaptation in vulnerable countries.

Note: Financial support for emission reductions ("mitigation") in developing countries, also a critical element of a global climate agreement, falls outside the scope of this note. Similarly, the need for a very significant scale-up in adaptation efforts in Canada is not quantified here. However, the mechanism discussed (dedicating a share of proceeds from an auction of allowances in a cap-and-trade system) would be an effective means of financing both of these priorities. Also outside the scope of this paper are the institutional mechanisms needed for managing adaptation funding.

Introduction

People living in poverty are least responsible for the climate crisis. Yet they are suffering its most severe effects: floods, drought, and storms, plus falling agricultural yields and the spread of insect-borne disease.

Since developing countries already grapple with greater environmental and economic pressures than their developed country peers and they have relatively low human, social and technological capital, they are more vulnerable to climate change and its consequences. Climate-related disasters disrupt livelihoods, undo years of development and impede growth. In Ethiopia, for example, fluctuations in the country's gross domestic product follow fluctuations in rainfall.

Complicating things further, the impacts of climate change are occuring faster than scientists predicted.[1] In the last two decades alone, the total number of disasters—mostly floods, droughts, and storms—quadrupled. Over the same period the number of people affected by disasters increased from 174 million to an average of more than 250 million a year.[2]

Many developing countries are facing growing water shortages, with more than one billion people likely to face inadequate water supplies by mid-century.[3] In some African countries, yields from rain-fed crops could be cut in half by 2020.[4] And water scarcity, combined with extreme weather events and rising temperatures, will likely lead to increased food shortages and spikes in diseases like dysentery and malaria.[5]

Unless the world moves very quickly to reduce greenhouse gas emissions and to help vulnerable communities adapt, we will be hard put to prevent a wholesale unravelling of past gains in the fight against poverty. Hunger, epidemics, mass migration, and growing conflict are some of the most salient concerns.

How much will climate adaptation cost?

Individual adaptation projects vary widely in cost, from as little as seventy dollars to as much as US$100 million. Estimates of the overall cost for all developing countries range from US$28 billion to US$86 billion per year [see table 1 for details].[6] Oxfam suggests it will cost at least US$50 billion per year beginning now[7]; the World Bank pegs the cost at US$75 billion per year as of 2030.[8]

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[1] Intergovernmental Panel on Climate Change (IPCC), "Climate change 2007," Fourth Assessment Report (2007-8).
[2] Oxfam International, "Climate Alarm: Disasters Increase as Climate Change Bites," (November 2007).
[3] Martin Parry et al, eds., "Climate Change 2007: Impacts adaptation and vulnerability" (Cambridge University Press, 2007), contribution of Working Group II to IPCC Fourth Assessment Report.
[4] Ibid.
[5] Jonathan A. Patz et al, "Impact of regional climate change on human health," *Nature* 438, no. 7066 (2005): 310-317.
[6] Martin Parry's analysis for IIED argues that the UNFCCC's analysis is a significant under-estimate. See http://www.iied.org/climate-change/key-issues/economics-and-equity-adaptation/costs-adapting-climate-change-significantly-under-estimated for details.
[7] Oxfam International, "Adapting to Climate Change: What's needed in poor countries and who should pay" (2007).
[8] World Bank, *World Development Report 2010: Development and Climate Change* (2009).

Table 1:
Global Cost Estimates for Climate Adaptation

Source	Estimated Cost Per Year (US$ billion)	Time-Frame
World Bank	75	By 2030
UNFCCC	28-67	Rising to 2030
Africa Group	67	Rising to 2020
Stern	50-100	2010-2020
UNDP	86	Rising to 2015
Oxfam	More than 50	Immediately

Source: Estimates compiled by Oxfam

Forty-three of the 49 poorest countries (Least Developed Countries) have drawn up national adaptation plans that identify priority actions and estimate their cost. To cover just the most urgent tasks outlined in those plans will cost at least US$1.5 billion per year.[9]

Under the United Nations Framework Convention on Climate Change (UNFCCC), signatories have agreed to share the cost of climate adaptation "on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities."[10]

Canada ranks among the top ten emitters of greenhouse gases on both an absolute and a per capita basis, and is also in the top ten global emitters on a cumulative basis.[11] Canada's capacity to contribute is also very significant: Canada sits near the top of the Human Development Index, and Canada's economy is currently among the soundest in the G8.

A range of formulas assess Canada's fair contribution as approximately 3 to 4 per cent of the global total, a proportion in line with Canada's contributions to other global needs, such as humanitarian response and fighting disease.[12] Multiplying that percentage by estimates of the finance needed for adaptation in developing countries shows Canada's fair annual contribution to be between C$1 billion and C$5 billion, with the average of the estimates included being C$2.6 billion, nearly half of Canada's total development assistance today.[13] [See Appendix II for calculations and Appendix IV for selected Canadian contributions to global efforts.]

The Copenhagen talks ought to achieve agreement on automatic and international means to generate at least a portion of the funds that poorer countries need. For example, aviation and maritime emission levies show significant promise and should be part of the solution. A global auction of emission allowances in those sectors could generate US$12 billion and US$16.6 billion in 2015, respectively.[14]

Canada need not wait for agreement on a new global climate deal to produce a credible plan to generate the required funding. Announcing a plan to provide our fair share of climate financing would significantly enhance Canada's credibility at the UNFCCC and at the G8/G20 summits in 2010.

[9] See http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php
[10] United Nations, 'United Nations Framework Convention on Climate Change', Article 3 (1992).
[11] World Resources Institute, Climate Analysis Indicators Tool (CAIT) Version 6.0 (2009).
[12] Canada has, on occasion contributed much more. See Appendix IV for data on selected cases.
[13] Contribution calculations by the Pembina Institute, based on estimates from the UNFCCC, Oxfam, and the UNDP. Canada's ODA in 2008 was US$4.725 billion, equivalent to Cdn$5.1 billion. See http://stats.oecd.org/index.aspx.
[14] Oxfam International, "Turning Carbon into Gold: How the international community can finance climate change adaptation without breaking the bank" (2008).

How can Canada pay for adaptation financing?

The amount of money Canada should provide to finance climate adaptation in vulnerable developing countries is significant, especially in this era of fiscal deficits. While a portion could come from general revenues, most could be funded by setting aside a percentage of the revenue from auctioning emissions allowances as part of a cap-and-trade regime.

The climate change bill passed by the U.S. House of Representatives in June 2009 takes this approach, mandating a percentage of emissions permits be used to fund support for adaptation, clean technology, and forest protection in developing countries. For adaptation specifically, the bill sets aside 1% of allowances from 2012-2021, a share that increases to 2% for 2022-2026, and to 4% for 2027-2050.[15]

Plans for the third phase of the European Trading System (which starts in 2013) will make auctioning of emission allowances the rule, rather than the exception. Member states have discretion over the use of allowance revenues, but the EU's Directive recommends that at least half the revenue will be used to pay for mitigation and adaptation, mainly within the EU, but also in developing countries.[16]

Financing adaptation through an annual auction of emissions permits would ensure sustainable funding, so that developing countries can make the medium and long-term investments required. Funds coming from the national budget, in contrast, are under constant stress and would require annual recommitment.

Revenue from the sales of emissions allowances could also be scaled up to meet potentially increasing adaptation needs, as the price of carbon is expected to rise over time. The percentage of emissions allowances needed to achieve the level of funding required would depend on the price of carbon. At a price of US$45 per ton, Oxfam calculates that auctioning 7.5% of emission allowances from industrialized countries would raise over US$50 billion per year in 2015.[17]

Financing adaptation in developing countries should not be confused with the purchase of offset credits to meet Canada's national emissions reduction target.[18] The primary source of funds suggested by this paper is the new government revenues that would be generated by the sale of emissions allowances to Canadian companies. Some of the adaptation projects eventually funded may have mitigation potential, but their purpose is to help people survive and they would not qualify as offsets.

[15] HR 2454 ("Waxman-Markey") also sets aside 5% for reducing emissions from deforestation in tropical countries (2012 to 2025, decreasing thereafter) and 1% to support the deployment of clean technology in developing countries (2012 to 2021, increasing thereafter).
[16] European Commission, "Emissions Trading System," http://ec.europa.eu/environment/climat/emission/auctioning_en.htm.
[17] Op. cit. Oxfam International (2008).
[18] See Section 3.3 of *Our Fair Share* (http://pubs.pembina.org/reports/our-fair-share-report.pdf) for a discussion of additionality in climate financing.

How could adaptation financing be integrated into a Canadian cap-and-trade system?

Data from a recent economic modelling study commissioned by the Pembina Institute and the David Suzuki Foundation from M.K. Jaccard and Associates provides a basis for estimating the price of carbon required to achieve Canada's emissions-reduction target and thus the revenue that carbon pricing would generate in Canada.[19] These estimates then allow for determining the percentage of revenues from the auction of emissions allowances that would be needed to cover Canada's fair share of adaptation costs.

The analysis concluded that reaching Canada's current national target of 20% below the 2006 level (the "government target") would require a carbon price of at least $100/tonne in 2020. To reach a target of 25% below 1990 in 2020 (the "2°C target") would require a price of $200/tonne.[20]

Both options would generate significant revenues. By 2020, the government target would generate nearly $55 billion annually and the 2°C target nearly $85 billion.[21] Under either scenario, allocating a small percentage of the allowance value in a cap-and-trade system to support climate adaptation in vulnerable countries would be sufficient to meet Canada's fair share obligations. For example, under a cap-and-trade system stringent enough to reach the government's target:

- 2% of the allowance value would generate approximately $1.1 billion per year in 2020
- 5% of the allowance value would generate approximately $2.6 billion per year in 2020
- 9% of the allowance value would generate approximately $5.0 billion per year in 2020.

For purposes of comparison, the U.S. "Waxman-Markey" bill devotes 7% of allowance value to climate action in developing countries, including avoiding deforestation, adaptation and the deployment of clean technology.

As noted, the Canadian calculations are based on estimates of the revenues generated by the auction of 100% of allowances in a cap-and-trade system stringent enough to produce a carbon price of $100/tonne by 2020. If the government adopts a weaker system, it would need to devote a larger share of the proceeds to adaptation in order to generate its fair share. Conversely, by adopting the stronger 2°C target, the government could generate its fair share with the auction of just 1–6% of allowances, depending which adaptation estimate is used.

As Canada develops its own cap-and-trade proposal in the coming months, it will be crucial to set aside allocations of an equal or greater magnitude from the outset, as there will be significant domestic competition for the revenues raised through auctioning.

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[19] *Climate Leadership, Economic Prosperity* is available at http://climate.pembina.org/pub/1909 (summary report), and the full technical report at http://climate.pembina.org/pub/1910. The analysis assumed a carbon price applied either through a cap-and-trade system with full auctioning or an economy-wide carbon tax. For modelling purposes, these two policies are interchangeable.

[20] In the modelling analysis, costs are expressed in 2005 Canadian dollars.

[21] Revenues from the government target are found in Table 46 of *Climate Leadership, Economic Prosperity*. The total is $49.8 billion ($2005), or $54.6 billion in current dollars. The 2°C target revenues, totalling $77.2 billion ($2005) or $84.5 in current dollars, are found at Table 30. Conversions to current dollars were made using IMF GDP deflators for 2005 and 2008 (the most recent data available).

Conclusion and recommendation

Canada must make a meaningful commitment to helping poor people cope with climate changes that are now inevitable. The Prime Minister has said that Canada will provide its fair share of the effort. It is time to spell out how much that is and how the funding will be raised.

According to Environment Minister Jim Prentice, Canada's cap-and-trade approach will be "drawn together" in 2010.[22] Now is an opportune moment to announce that set-asides to finance climate adaptation in vulnerable countries will be an integral part of Canada's cap-and-trade system.

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[22] http://www.ec.gc.ca/default.asp?lang=En&n=6F2DE1CA-1&news=400A4566-DA85-4A0C-B9F4-BABE2DF555C7 (June 4, 2009).

Appendix I: How does auctioning work in a cap-and-trade system?

A cap-and-trade system creates a market for reductions in greenhouse gas (GHG) pollution by creating a fixed number of emission allowances (the "cap"), thereby creating scarcity. Companies covered by the cap are required to purchase from the government an allowance for each tonne of GHG pollution they emit. Emitters are also free to trade amongst themselves, buying and selling allowances to meet their needs. In this system, allowances are worth money.

Governments can choose to distribute allowances for free to companies, thereby turning over that allowance value to the private sector. Experience in the EU and elsewhere has shown that this can lead to windfall profits and creates a complex, highly politicized process to determine how much allowance value each sector should receive.

A simpler way to allocate this value is to hold an auction to sell allowances to companies who need them. Industry Canada describes a similar process launched in 2008 by then Industry Minister Jim Prentice to auction wireless rights:

> A spectrum auction is a market-based tool that allows the Government to identify those entities who value the spectrum the most and who will therefore be assumed to put that spectrum to its most efficient use. Auctions are also procedurally efficient and provide a means for Canadian taxpayers to be compensated for the use of this public resource. A well-designed auction process is open and objective and the auction rules can be designed to achieve various public policy objectives.[23]

In this way, governments can direct the revenue generated toward public purposes. Auctioning at least a fraction of the allowances is part of cap-and-trade proposals or systems in the US, the EU, Australia, the Western Climate Initiative, and the Regional Greenhouse Gas Initiative.

Appendix II: Calculations of Canada's Fair Share

Table 2: Canada's Fair Share of Adaptation Financing (in current C$ billions)

Canada's Percentage Share of Total		Share of Low Estimate ($39.7 billion)	Share of High Estimate ($116.3 billion)	Share of Oxfam Estimate ($67.6 billion)
Low Share	2.7%	1.1	3.1	1.8
High Share	4.3%	1.7	5.0	2.9
Average Share	3.5%	1.4	4.1	2.4
Average Fair Share Contribution		**2.6**		

[23] http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01626.html.

The lowest currently applicable estimate of adaptation costs is the lower bound of the UNFCCC's 2008 estimate. Converted to current Canadian dollars, this estimate is equivalent to $39.7 billion/year. This is referred to as "low estimate" in Table 2.

The highest currently applicable estimate of adaptation costs is the UN Development Program's estimate. Converted to current Canadian dollars, this estimate is equivalent to $116.3 billion/year. This is referred to as "high estimate" in Table 2.

Oxfam's estimate of adaptation costs is equivalent to $67.6 billion/year in current Canadian dollars. This is referred to as the "Oxfam estimate" in Table 2.

Of the five assessed contribution methods included in the Pembina Institute's financing calculations, the lowest percentage assessed to Canada is 2.7%, the highest is 4.3%, and the average is 3.5%.[24]

Appendix III: Calculations of Auction Revenue

Table 3: Percentage of Total Allowance Value Needed to Generate Canada's "Fair Share" of Adaptation Financing

Financing Required (C$ billions)		Percentage of Government Target	Percentage of 2°C target
Low	1.1	2	1
Average	2.6	5	3
High	5.0	9	6

The Technical Report accompanying the Pembina Institute/David Suzuki Foundation report entitled *Climate Leadership, Economic Prosperity* provides estimates of carbon pricing revenue generated in Canada under two cap-and-trade systems: a system adequate to meet the government's current 2020 target ("government target") and a system adequate to meet a target of 25% below 1990 in 2020 ("2°C target").[25]

Under "government target," the total allowance value in 2020 is equivalent to $54.6 billion. Under "2°C target," total allowance value in 2020 is equivalent to $84.5 billion. In a cap-and-trade system with full auctioning, allowance value is equivalent to auction revenues.

[24] All estimates and calculations from *Our Fair Share: Canada's Role in Supporting Global Climate Solutions*, Appendices A and B. (The World Bank's 2006 estimate, which was then the lowest, has now been superseded by the World Bank's 2009 estimate.)

[25] See Table 46 and Table 30 of M.K.J.A. and Associates, *Exploration of Two Canadian Greenhouse Gas Emission Targets* (available online at http://climate.pembina.org/pub/1910). The scenario selected is "Canada Goes Further." Results in that study are presented in 2005 Canadian dollars; conversions to current dollars were made using IMF GDP deflators for 2005 and 2008 (the most recent data available).

Appendix IV: Canadian Contributions to Selected Global Efforts

Table 4: UN Central Emergency Response Fund (US$)

Year	Number of Countries Contributing	Total Contributions	Canada's Contribution	Canada's % of Total
2009	77	399,884,254*	34,566,877	8.64%
2008	81	453,198,155	39,037,523	8.61%
2007	67	385,120,313	35,116,374	9.12%
2006	52	298,712,452	21,941,309	7.35%

* including $25 million in unpaid pledges
Source: http://ochaonline.un.org/Donors/Donors/tabid/5370/language/en-US/Default.aspx

Table 5: Consultative Group on International Agricultural Research (US$)

Year	Total Contributions	Canada's Contribution	Canada's % of Total
2008	531 million	34.1 million	6.42%
2007	495 million	31.1 million	6.28%

Source: http://www.cgiar.org/pdf/pub_cg_corp_folder_inserts_FINANCIAL_10_09.pdf

Table 6: Fast Track Initiative for Universal Primary Education (US$)

Program	Years	Total Contributions	Canada's Contribution	Canada's % of Total
Catalytic Fund	2004-2007	833.1 million	17.4 million	2.09%
Education Program Development Fund	2005-2006	52.26 million	3.40 million	6.50%

Sources: http://www.education-fast-track-fr.org/library/EPDF_reportmay07.pdf; http://www.educationfasttrack.org/media/library/Secure/Board_Documents_Rome_2009/Tab%203_CF_UPDATE_November_2009.pdf

Table 7: Global Fund for AIDS, TB and Malaria (pledges, US$)

Year	Total Contributions	Canada's Contribution	Canada's % of Total
2010	3,230,109,710	139,873,182	4.33%
2009	3,313,659,614	138,629,618	4.18%
2008	3,077,363,120	129,109,851	4.20%
2007	2,675,455,497	110,599,894	4.13%
2006	2,035,844,340	110,599,894	5.43%
2005	1,506,800,083	110,262,267	7.32%

Source: http://www.theglobalfund.org/en/pledges/?lang=en