Clearing The Air:

A Preliminary Analysis of Air Quality Co-Benefits from Reduced Greenhouse Gas Emissions in Canada

Debate over ways to meet Canada's commitment to the Kyoto Protocol and reduce climate change tend to focus on the cost of meeting this challenge. But reducing greenhouse gas emissions does not just have a cost, it also has substantial health and economic benefits. These co-benefits exist over and above those gained by reducing climate change and satisfying an international agreement.

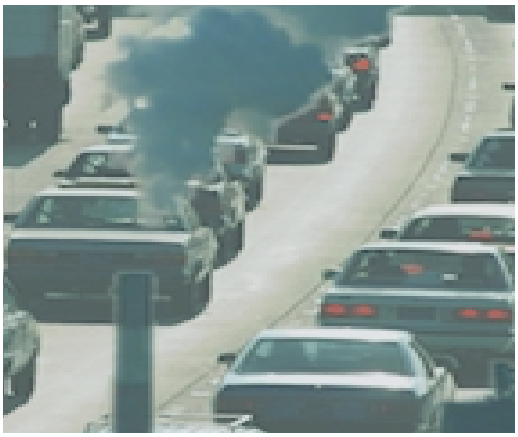
Under contract from the David Suzuki Foundation, Alchemy Consulting Inc. and Constable Associates Consulting Inc. prepared a preliminary analysis of some of these environmental and health co-benefits, resulting from six specific greenhouse gas (GHG) emission reduction measures. These represent a small sample of the large number of measures proposed in the National Climate Change Process' Issue Tables Options Papers.

The measures analysed include:

- fuel efficiency standards for vehicles;
- phased increases in fuel taxes (one cent per litre per year for 10 years);
- increased public transit;
- fuel switching in electricity generation;
- more renewable resources in electricity generation;
- home and commercial building energy efficiency retrofits.

Direct Benefits

These six measures alone would achieve CO_2 reductions of 68 million tonnes/year in 2010 - nine per cent of the projected national total in 2010 of 748 million tonnes per year **and 36 per cent of the estimated reduction necessary to meet Canada's Kyoto commitment** of 187 million tonnes per year in 2010.



Co-Benefits

These measures would also appreciably reduce common air contaminants (CACs). This includes 220,000 tonnes per year of SO_2 (nine per cent of the Canadian national inventory) and 140,000 tonnes per year of NOx (seven per cent of the national inventory). For comparison, the SO_2 reduction is several times greater than the effect of reducing sulphur content in gasoline to meet the new Canadian standards and the NOx reduction is somewhat greater than the effect of implementing the new (Tier 2) vehicle emission standards.

The avoided damage value of the CAC reductions is estimated to be in the order of $1.2 billion/year in 2010, with a range of $340 million to as much as $2.2 billion/year. The following are examples of the kinds of damages that were included to achieve these figures:

- cost of emergency room and hospital visits for respiratory and cardiac illness made worse by air pollution;
- estimated value of reduced life expectancy due to exposure to fine particles and ozone pollutants (this variable is key to the wide range in the overall avoided damage value because it is difficult to measure, and has the greatest diversity in value assessment);
- cost of lost days of work due to respiratory illness related to air pollution.

Co-Benefits

Many other general economic benefits would accompany the improved energy efficiency and enhanced community development that will result from measures to reduce greenhouse gas emissions, but these are beyond the scope of this exercise. Example of co-benefits not included are:

- Improved energy efficiency of the economy generally (job creation in existing industries due to improved efficiency and in new energy efficiency industries, recycling of dollars formerly spent on fossil fuels);
- Reduced human exposure to toxic air contaminants (possibly related to lung cancer);
- Avoided flooding and other land requirements (lower demand for hydroelectricity & other generating facilities);
- Avoided community impacts (lower demand for transportation infrastructure, developed land use).

Including the above co-benefits could increase the amount of avoided damages significantly.

Table 9 below summarizes the total emission reductions of greenhouse gasses and common air contaminants that we have estimated for all six measures. Numbers have been rounded.

Table 9. Summary of Local Air Pollution and Greenhouse Gas Emission Reductions by Measure

Measure	GHGs (MT/y)	SOx (t/y)	NOx (t/y)	VOC (t/y)	PM (t/y)
Transportation					
Road fuel tax	4.7-10.3	60	13,600	4,000	1,800
Incr. public transit	10.1	50	7,000	4,000	1,300
Fuel efficiency	5.2-6.5	160	22,500	30,800	small
Electricity Generation					
Fuel switching	28	189,000	72,000	NA	17,000[C]
10% Renewables	9	34,500	18,000	NA	2,200[C]
Community Buildings					
Energy efficient retrofits	7.5	75	11,270	340	2,630
All 6 measures	**68**	**223,500**	**144,000**	**39,000**	**25,700[A]**
% of National Inventory (% of Kyoto requirement)	9% (36%)[B]	9%	7%	1.4%	1%[D]

A) May be assumed to be $PM_{2.5}$ (including 14,700 t/y primary and 11,000 t/y secondary contributions from all measures).

B) Based on NRCan's most recent estimate of the reduction requirement in 2010 as 25% of 748 MT = 187 MT.

C) Including secondary PM.

D) Based on relative reduction of primary $PM_{2.5}$ only.

The cost-benefit analysis of emission reductions used here has been developed over the past 40 years. It is an essential partner to any analysis of implementation costs in modern regulatory impact assessment in Canada and the US.

David Suzuki Foundation

Finding solutions

Contact Information:

Climate Change Campaign
The David Suzuki Foundation
219, 2211 West 4th Ave,
Vancouver, BC Canada V6K 4S2
Tel (604) 732-4228 Fax (604) 732-0752

email climate@davidsuzuki.org
website www.davidsuzuki.org