

Greenhouse Gas Emissions



Noteworthy:

- Alberta's total primary energy use increased by 141% between 1978 and 2003.
- Greenhouse gas emissions from secondary energy use increased by 33% between 1990 and 2003. (Secondary energy is that used by final consumers for residential, agriculture, commercial, industrial and transportation purposes.)
- The average car generates 4.72 tonnes of carbon dioxide per year, based on a total distance of 20,000 km traveled per year at a fuel consumption rate of 10 km per litre of fuel.
- The benefits of greenhouse gas emission reductions include reductions in other air pollutants. Improved energy efficiency reduces greenhouse gas emissions and produces financial savings and new jobs.
- *Canadian Solutions - Practical and Affordable Steps to Fight Climate Change* (Pembina Institute and David Suzuki Foundation, 1998) provides a detailed implementation plan to meet Canada's Kyoto target, focusing on: improving energy efficiency and conservation; shifting from high carbon fossil fuels such as coal, to less carbon intensive fossil fuels as a transition to renewable energy; and increasing the use of renewable energy sources such as wind, solar, and biomass energy.

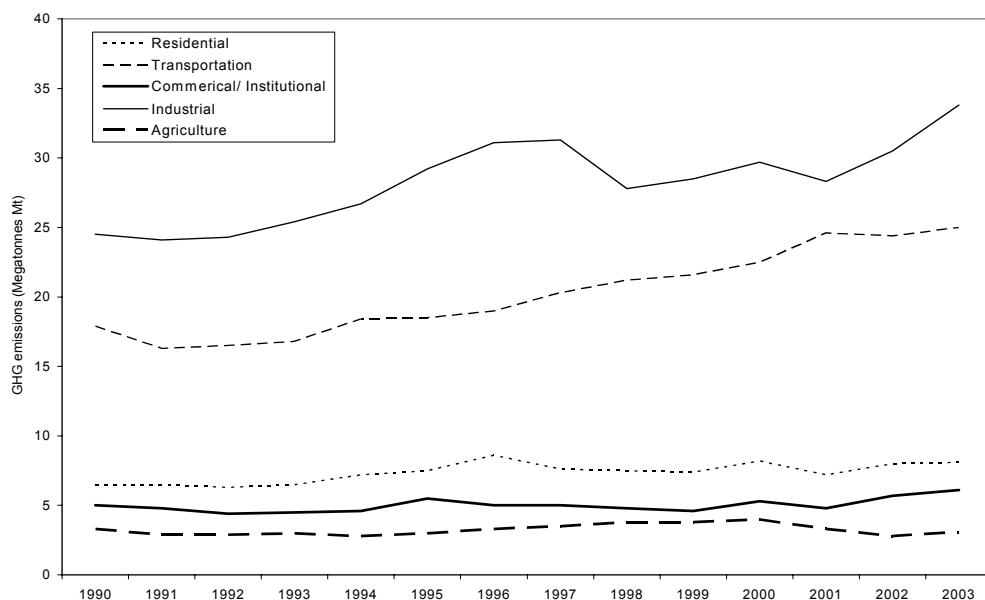
Greenhouse Gas Emissions in Alberta: How Much?

Canada is the world's second largest consumer of fossil fuels on a per capita basis. Despite an international commitment to decrease our emissions to 6% below 1990 levels by 2008 to 2012, Canada's greenhouse gas (GHG) emissions increased by 23% between 1990 and 2003. Our emissions are projected to be 41% higher by 2020. Based on the projections of the national GHG inventory, Alberta's emissions increased 33% between 1990 and 2003; by 2010, emissions are expected to be 40% higher than in

1990. The largest proportion of emissions in Alberta come from the industrial sector (44% in 2003), followed by transportation (33% in 2003). Between 1990 and 1997, the largest percent increase in emissions was in the transportation sector (26.5%), followed by a 25.4% increase in electricity generation (mostly coal-fired) emissions, and a 24.4% increase in industrial emissions. Residential emissions increased 11%. Using Statistics Canada data of Alberta's primary energy de-

mand and energy-to-emissions conversion factors, we estimated the change in greenhouse gas emissions from 1990 back to 1961. This estimate indicates that a total of 29.5 megatonnes of GHGs were emitted in 1961. On a per-Albertan basis, GHG emissions have increased three-fold from 22 tonnes per capita in 1961 to 68.1 tonnes per capita in 2003.

Alberta's Greenhouse Gas Emissions by Sector, 1990 to 2003



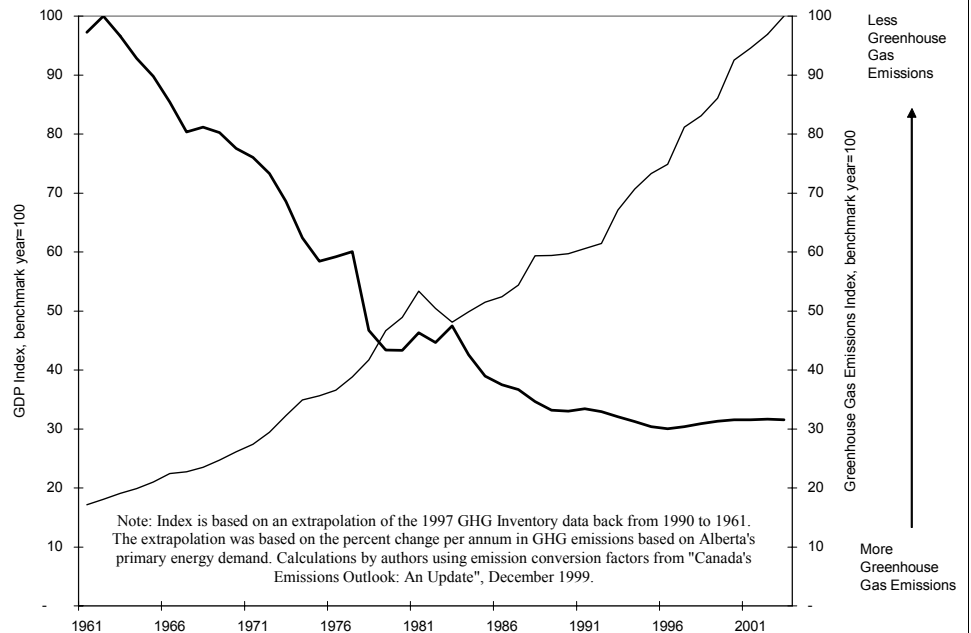
Source: Natural Resources Canada, Office of Energy Efficiency

So What?

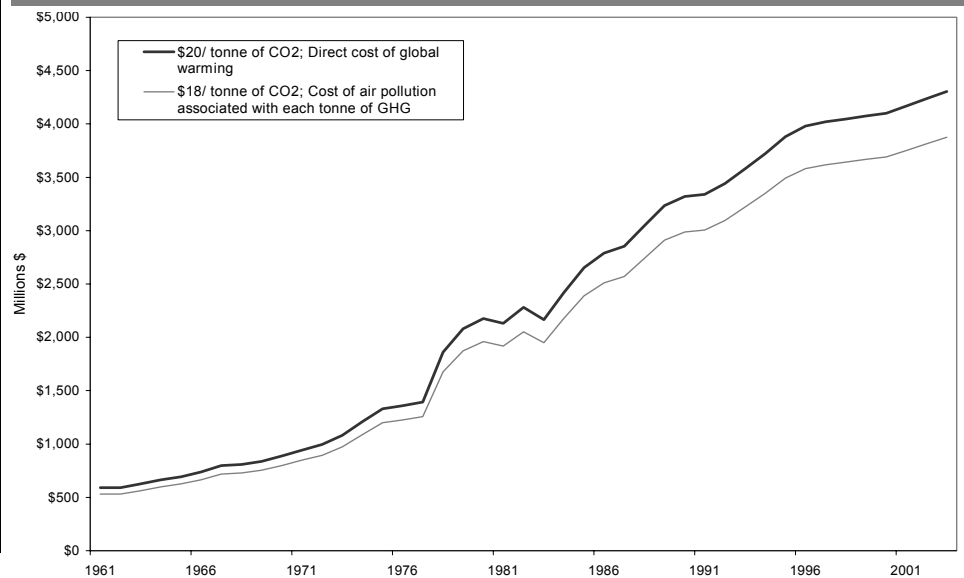
As Alberta expands its extraction of natural gas and oil sands, its global carbon footprint will also grow. The continuing increase in burning of fossil fuels will generally also increase air pollution (to a greater or lesser degree, depending on fuel efficiency and technology) as well as associated health problems and costs. Air pollution reduction is connected to greenhouse gas (GHG) mitigation efforts because a reduction in fossil fuel use leads to decreased emissions of sulphur dioxide, particulate matter, nitrogen oxides, heavy metals (mercury, lead, cadmium), volatile organic compounds, and the formation of ground-level ozone. One study found that six selected measures that would reduce GHG emissions by 9% from projected levels in 2010, would produce co-benefits worth an estimated \$1.2 billion (1998\$) in the year of implementation (@\$18/tonne of CO₂).

The total cost of Alberta's GHG emissions due to the health and environmental impacts of the air pollutants associated with each unit of greenhouse gas emitted, is reported in the GPI air quality section (\$531.5 million in 1961; \$2.7 billion in 2003; 1998\$). In addition, the direct public health, social and environmental costs of the impacts of climate change, such as sea level rise or increased temperatures, have been estimated to range from \$5 to \$50 or more per tonne of CO₂. Based on a conservative cost of \$20 per tonne of CO₂ emitted, we estimate the cost of Alberta's greenhouse gas emissions has risen from \$590.5 million (1998\$) in 1961, to \$4.3 billion (1998\$) in 2003.

Greenhouse Gas Emissions Index: Where are we today?



Estimated Direct Global Warming Costs and Air Pollution Costs of Alberta's Greenhouse Gas Emissions, 1961 to 2003



Sources: 1997 GHG Inventory, Caton, R., and Constable, S. 2000. Clearing the Air: A preliminary analysis of air quality co-benefits from reduced greenhouse gas emissions in Canada. David Suzuki Foundation, Vancouver, BC.

On a scale where 100 is the lowest level of emissions over the study period, the level of greenhouse gas emissions in 2003 ranks 31.6.

The estimated direct public health, social and environmental value of impacts of climate change, such as sea level rise or increased temperatures due to greenhouse gas emissions, were estimated at \$4.3 billion in 2003 (\$20/tonne of CO₂-equivalent emitted), equal to 3.4% of 2003 GDP.

