

Carbon Budget Deficit



Noteworthy:

- In 1961, Alberta emitted an estimated 8.16 megatonnes of carbon (Mt C) in the form of greenhouse gas emissions; this represented roughly 47.3% of the annual carbon absorption capacity (17.25 Mt C) of Alberta's forests, soils and ecosystems.
- By 2003, Alberta was emitting an estimated 58.75 Mt C while the absorptive capacity of the natural environment remained virtually unchanged from 1961 at 15 Mt of C; the result is that emissions now exceed absorptive capacity by 400%.
- Canadian Forest Service studies of forest carbon budgets show that in 1994, Canada's forests and peatlands contained approximately 225 gigatonnes of carbon (Gt C), with roughly 85.3 Gt C in forests and forest products (70.1 Gt in forest soils and litter, 14.3 Gt in tree biomass, and 0.9 Gt in forest products) and an additional 139.7 Gt C in peatlands.
- Studies have found that Canada's forests had been a net sink for atmospheric carbon, absorbing an average of 174 Mt C per year until the 1970s when carbon losses began to occur. From 1990 to 1994, Canada's forest biomass, soils and forest ecosystems have actually become a net source of atmospheric carbon adding about 44.6 Mt C/year.
- The same studies have found that the Boreal West and Cordilleran ecoclimatic regions (of which Alberta's forests are part) were net sinks of carbon from 1990 to 1994.

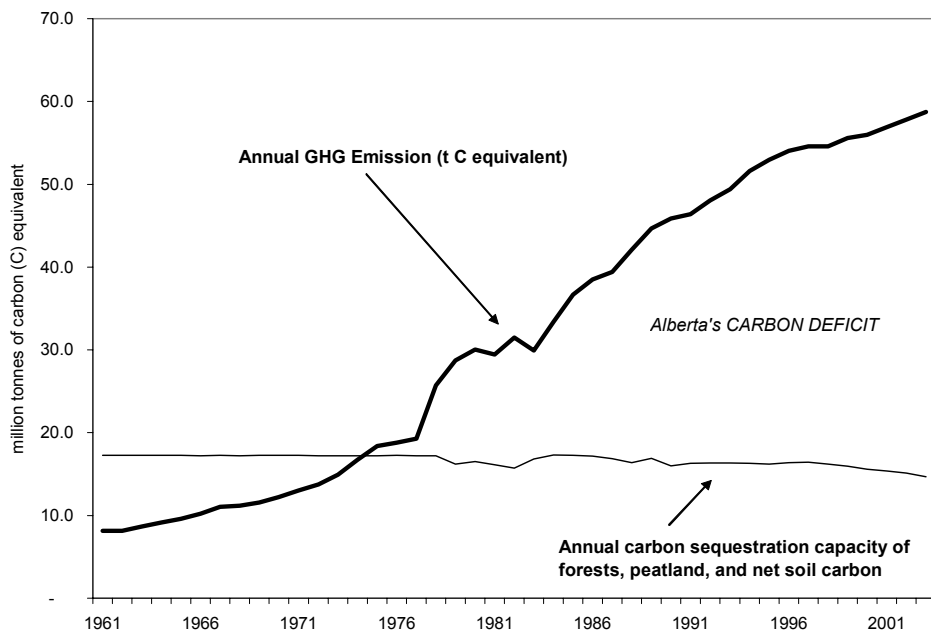
The State of Alberta's Carbon Deficit

With the significance of climate change and its connection to greenhouse gas emissions, carbon (as CO₂) has taken on both "market value" and strategic importance to nations. CO₂ emissions trading systems place a monetary "value" (shadow price) on carbon that reflects the anticipated financial liabilities from emissions related to climate change impacts. Recent Canadian Forest Service (CFS) carbon budgeting studies have focused on Canada's forests

and found that from the early 1980s they have become a net source of carbon. The Pembina Institute has constructed a full carbon budget for Alberta that compares the balance between carbon storage by ecosystems (including forest biomass, peatland, soils and other vegetation) and the carbon released through combustion of fossil fuels. Data is drawn from emissions data and from CFS and other carbon studies and is linked to

other Alberta GPI resource accounts to yield a preliminary carbon budget for Alberta. Comparing annual greenhouse gas carbon-equivalent emissions to the estimated annual carbon absorption rate of forests, peatlands and soils for Alberta's total land area shows that Alberta went from a healthy carbon surplus in the 1960s to a significant and growing carbon deficit in the 1990s.

Carbon Budget in Alberta, 1961 to 2003

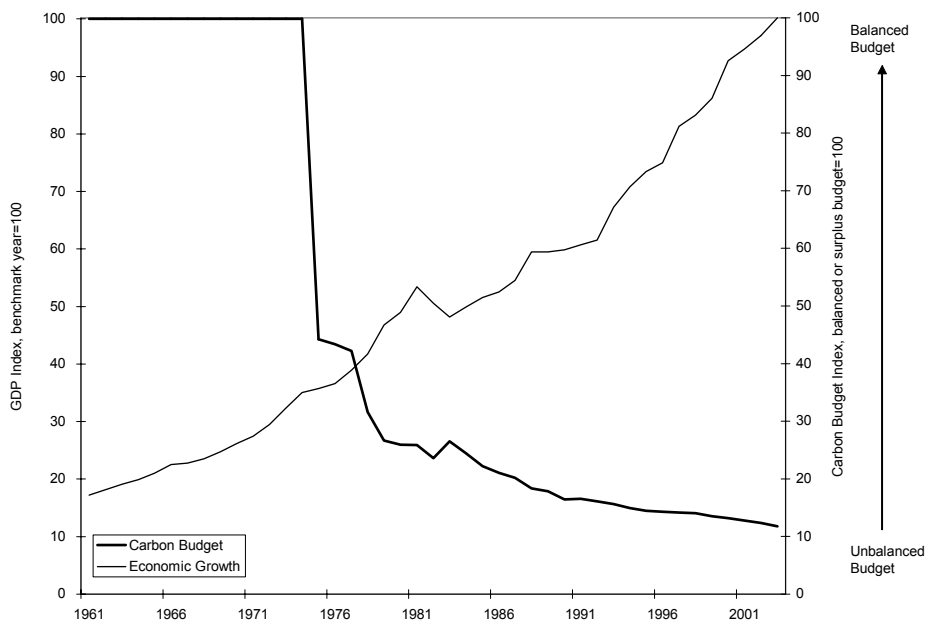


Source: derived from Statistics Canada and Canadian Forest Service statistics and found in Alberta GPI carbon, forest, peatland and agriculture soil accounts

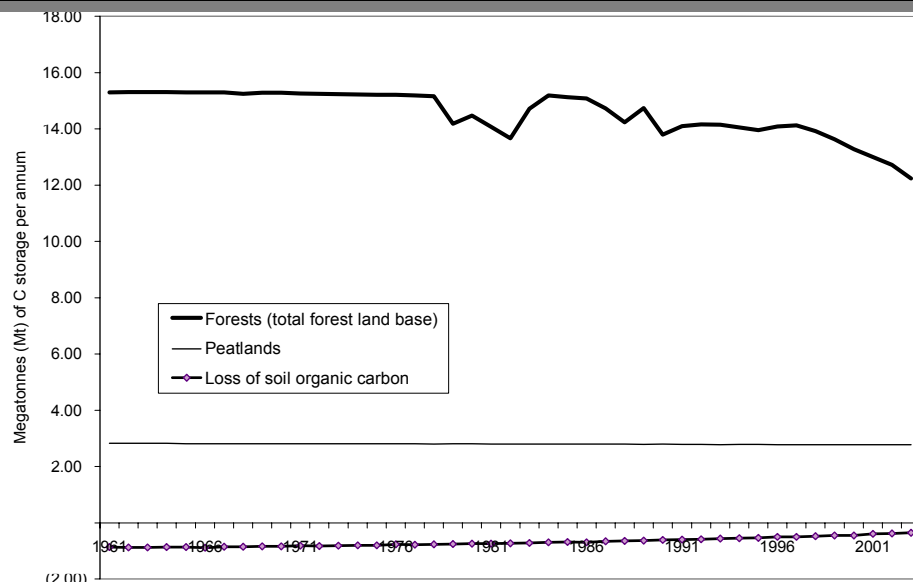
So What?

Alberta's carbon deficit continues to grow as economic growth expands (see figure to the right). The province's carbon liability affects not only Alberta but also the rest of the planet. Carbon budgets, like financial budgets, should be managed on the principle that deficits be avoided and surpluses maintained. Alberta's carbon deficit or carbon footprint continues to grow. While we await the results of more comprehensive carbon budgets, our preliminary carbon accounts for Alberta suggest that Alberta's carbon deficit is increasing. Eliminating our carbon deficit will require a reduction in absolute greenhouse gas emissions from all sources. While careful carbon management with respect to forests, agriculture soils, and peatlands is also important, our carbon accounts suggest that efforts to increase carbon storage capacity through land management techniques will be woefully inadequate to reduce the carbon deficit. Alberta should be putting as much energy into lowering its carbon debt to the world as it did to reduce its financial debt load. This could be achieved through investments in eco-efficient technologies that reduce carbon emissions at their source as well as developing renewable energy capacity that would offset current greenhouse gas emissions. The continued development of Alberta's non-renewable energy resources as well as continued loss of ecological integrity due to oil and gas exploration and development in Alberta's forest ecoregions will simply exacerbate Alberta's growing carbon deficit. The economic and financial costs of Alberta's carbon deficit are felt around the world in the form of increasing costs of climate-change related environmental disasters and clean up for which Alberta shares at least partial responsibility.

Alberta Carbon Budget Deficit Index: Where are we today?



Alberta's Carbon Absorption Rates by Forests and Peatlands, and Loss of Soil Organic Carbon, 1961 to 2003



Source: Derived from Statistics Canada and Canadian Forest Service statistics and found in Alberta GPI carbon, forest, peatland and agriculture soil accounts

As an index, the carbon budget in 2003 ranked 12 on a scale where 100 is a balanced or surplus carbon budget (see figure above).

The cost of carbon deficits is already included in the estimated costs of greenhouse gas emissions in the GPI income statement.

