

Measuring Genuine Progress: Accounting for Climate Change

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Summary Brief: Background to the Presentation

Those concerned about the potential impacts of climate change find themselves today in a most disquieting situation. On the one hand, a wealth of scientific research points to climate change as the greatest environmental challenge of the century and to the need for urgent action to curb greenhouse gas emissions from anthropogenic sources. On the other hand, very little real progress is being made, and there exists neither the political nor the social will to curb the rapid rates of economic growth that depend on continued high rates of fossil fuel combustion.

This presentation will argue that so long as economic growth remains the unquestioned and unchallenged benchmark of well-being and prosperity, we will make little headway in reducing greenhouse gas emissions. Policy makers will have little incentive to heed the warnings of scientists, so long as core indicators and measures of well-being signify increased fossil fuel combustion as "progress." On the other hand, it is possible for alternative measures of genuine progress to infiltrate the policy arena, and to send different signals that can help assign climate change its rightful place on the policy agenda.

It is not enough for a convincing body of scientific evidence to speak for itself. If that evidence is not in synchrony with core social indicators of well-being, it will not enter the policy arena. It is no longer sufficient for State of the Environment reports to exist as separate entities and bodies of evidence that briefly arouse the interest of environmentalists. Unless that evidence enters the mainstream of core indicators used to assess social well-being and progress, it will remain ineffectual as an instrument of change.

Indicators are powerful: They not only reflect our values as a society, but also determine what makes it onto the policy agenda. If a group of students is told that a term paper is extremely important and will constitute the most meaningful learning experience of the semester, and that it is worth 2% of the final grade, the students will be forgiven for putting all their effort into the final exam instead. No matter what is said, the real message conveyed is that the term paper is value-less. This is a precise metaphor for our current valuations of environmental quality. In fact, our present situation is worse than that. It is more analogous to the students being told that they will have points deducted from their final grade if they do the term paper.

We currently assess our well-being and prosperity according to a narrow set of market indicators based on the Gross Domestic Product. Small changes in GDP growth rates, interest rates, currency exchange rates, and the Dow Jones or TSE averages, send an adrenaline rush through

the veins of policy makers, economists and journalists, and spawn endless analyses of what the changes signify. Even the language of health has been appropriated to describe a rapidly growing economy as "robust," "strong," "booming," "healthy," and "dynamic," while a decline in spending means that consumer confidence is "weak" and "feeble," and the economy "sickly." A declining GDP may signify a "depression."

Though economists claim that the GDP is an objective and neutral measure, it is actually highly value-laden the moment it is misused as a measure of well-being -- a role its architects never intended it to perform. In effect, "more" is taken as "better" when GDP growth rates are taken to signify progress, as they are almost universally. Simon Kuznets, Nobel Prize winner and principal designer of national income accounting, warned half a century ago, that income accounts should never be used, as they are today, to assess a nation's welfare. They do nothing more than add up the total quantity of goods and services produced in a year, and they were actually introduced during the second world war to measure Britain's wartime production. Measures of well-being, said Kuznets, must always specify what kind of growth and for what purpose.

Current Measures of Progress Blunt Climate Change Initiatives

When the GDP and economic growth rates are misused as measures of progress, they send highly misleading signals to policy-makers, signals which in effect blunt potential policy initiatives to reduce greenhouse gas emissions and to slow climate change:

1. The GDP counts natural resource depletion as economic gain. The more trees that are cut down and the more rapidly they are cut down, the more quickly the economy will grow. This is, of course, simply bad accounting -- the equivalent of a factory owner selling off his machinery and counting it as profit. Though our market statistics account for the depreciation of manufactured capital, they have no mechanism to account for resource wealth as natural capital assets that are also subject to depreciation.

Only when they are harvested, extracted and sold, do natural resources appear in our core economic accounts. And so, deforestation, a major contributor to climate change, is counted as a sign of progress in our conventional measures of prosperity. Because the loss in capital stocks remains invisible, policy makers get no early warning signals of gradual resource decline. A collapse in stocks, as in the Atlantic ground-fishery, is a surprise and a sudden crisis.

Four years ago, the National Round Table on the Environment and the Economy warned that, due to unsustainable harvesting levels, Maritime woodlots might be on the verge of an industry collapse analogous to the ground-fishery. The strongly-worded report barely created a blip on the policy screen. The annual area clear-cut in Nova Scotia has in fact doubled since 1992.

In the last 40 years, Nova Scotia has lost nearly all its old trees. In 1958, when the forest was already far from pristine, having been logged intensively for two centuries, 24% of

Nova Scotia forest area still had trees more than 80 years old, and 8% of forest area had trees more than 100 years old. Today, less than 2% of Nova Scotia forest area has trees more than 80 years old, and only 0.15% has trees more than 100 years old. Until they appeared in a GPI Atlantic report, these numbers were not even publicly known, let alone recorded as sign of lost wealth in our economic accounts. Not surprisingly, the loss of old trees is not a policy issue.

The same failure to distinguish income from assets characterizes our depletion of fossil fuels. The more fossil fuels we extract and the more rapidly we do so, the more the economy will grow. How can we hope to advance an agenda of car-pooling and mass transit promotion when conservation methods register in policy arenas as a decline in prosperity. The more oil and gas sold, the more cars that are driven with lone riders, the more congestion created, and the more roads that are built, the more the economy will grow. Every sale and expenditure contributes to the GDP, while resource depletion remains invisible in the economic accounts. Our "boom" economy can thrive even as our natural wealth and asset base shrink.

2. Quantitative growth measures make no distinction between economic activities that create benefit and those that create harm. The GDP has been likened to a policeman who measures his day's performance by the number of street activities he observes -- a lady walking her dog, a thug hitting someone with a lead pipe, children playing on the street corner, someone breaking into a car -- it makes no difference. If he observed 326 activities today compared to 315 yesterday, he has had a "better" day and made progress. In practice we expect more of our policeman. We expect him to distinguish harmful from beneficial activities, -- to prevent the former and protect the latter. And we should expect no less of our policy makers.

When our current accounting system and economic growth rates are used to assess our well-being and progress, we actually count crime, pollution, sickness, accidents and natural disasters as contributions to prosperity. Whenever money is spent, the economy grows, regardless of where the money is spent. And so the Exxon Valdez contributed far more to the U.S. economy by spilling its oil than if it had delivered its oil safely to port, because the spill spawned huge expenditures on clean-up, legal costs, repair, news stories, and much more.

When we compare ourselves continuously with the United States as the model of a "robust" and growing economy, we fail to note that imprisonment is one of the fastest growing sectors of the American economy -- at an average 6.2% annual growth rate since 1990, faster than the "healthy" 3.5% overall GDP growth rate. Two million Americans are today behind bars, 25% of all the world's prisoners and one in 135 of all U.S. citizens. Prison building contributes \$7 billion a year to the U.S. economy, and the maintenance of those prisons another \$35 billion, with the prison industry today the country's second largest employer after General Motors. The U.S. security industry contributes \$55 billion more to the economy, with schools the biggest customers since the Littleton, Colorado, massacre, which in itself was an economic boon.

The implications of this accounting system for climate change are obvious. Not only does every expenditure on fossil fuels contribute to economic growth, but the actual damages from climate change make an additional contribution. Storm damage clean-up costs, irrigation projects in drought-stricken farmlands, flood control expenditures to guard against sea-level rise -- all of them make the economy grow. So long as the sum of our economic activity (like the policeman's street activity) is taken as the proxy for our well-being, and as long as GDP growth rates are used to assess societal prosperity and progress, there is little incentive for policy makers to curb greenhouse gas emissions.

3. There are other major flaws in the misuse of economic growth statistics as proxies for well-being and prosperity. Because the GDP counts only goods and services exchanged for money, unpaid household work and voluntary work remain invisible in our measures of progress. In fact, a considerable portion of what is recorded as "growth" is simply the shift of economic activities like child care, meal preparation and housework from the unpaid household sector to the paid market sector.

By the same token, the 8.7% decline in voluntary work across Canada since 1992 was unreported and unrecorded until it appeared in a GPI Atlantic report. Even though the decline in voluntary work is costing the country \$4.7 billion a year in lost voluntary services, the issue is not discussed in any legislature, academic forum or media outlet. Because unpaid work is invisible and "value-less" in our economic accounts and therefore in our measures of progress, its loss is a non-issue. That is an apt metaphor for the failure of climate change issues to make a serious impact in the policy arena. By contrast, it is worth contemplating the policy reaction to a hypothetical 8.7% decline in GDP. That, surely, would be considered a national emergency, worthy of round-the-clock cabinet meetings to stave off the "depression."

Because only paid work is counted in measures of progress based on the GDP, the economy will grow in proportion to the number of hours we work. Free time has no value in our current measures of well-being. In fact, its loss, like the depletion of our natural resources, is recorded as economic gain. From 1995 through 1998, the latest year for which figures are available, middle-income family members in the U.S. added 70 hours a year on average to their work time, or nearly 1.8 additional weeks. From 1989 through 1998, the increase in work time was 3.4 weeks. The U.S., our model of a "robust" economy has now passed Japan for the dubious distinction of having the longest work hours in the industrial world.

Needless to say, all those extra work hours fuel increased levels of production and consumption, which in turn fuel fossil fuel combustion and greenhouse gas emissions. The purpose of this analysis is not to "blame" governments. While we, as consumers, measure how "well off" we are according to completely materialist standards, like the size of our houses and our ability to put an SUV in the driveway, we should not be surprised to see higher new car and minivan sales reported on the financial pages as a sign of "consumer confidence" and a "healthy" economy.

A Better Measure of Progress

If the flaws of our current reliance on income accounting mechanisms to assess well-being and progress are understood, then the alternative is clear and straight-forward. The presentation to the Costing Canadian Climate Change workshop will explain ongoing work in Nova Scotia to construct a Genuine Progress Index (GPI) that integrates 22 sets of economic, social and environmental variables into a more accurate and comprehensive measure of well-being.

The GPI includes natural resource accounts that track the health of our natural capital assets, and it counts crime, pollution, accidents and greenhouse gas emissions as costs rather than gains to the economy. Unlike measures of well-being based on the GDP, in which "more" is always "better," the GPI is quite explicit that "less" is sometimes "better." Less crime, less pollution, and less greenhouse gas emissions are signs of progress in the GPI.

The 22 components of the Nova Scotia Genuine Progress Index are as follows:

Time Use:

- * Economic Value of Civic and Voluntary Work
- * Economic Value of Unpaid Housework and Childcare
- * Costs of Underemployment
- * Value of Leisure Time

Natural Capital:

- * Soils and Agriculture
- * Forests
- * Marine Environment/Fisheries
- * Nonrenewable Subsoil Assets

Environment:

- * Greenhouse Gas Emissions
- * Sustainable Transportation
- * Ecological Footprint Analysis
- * Air Quality
- * Water Quality
- * Solid Waste

Socioeconomic:

- * Income Distribution
- * Debt, External Borrowing and Capital Movements
- * Valuations of Durability
- * Composite Livelihood Security Index

Social Capital:

- * Health Care
- * Educational Attainment
- * Costs of Crime
- * Human Freedom Index

A pilot project for Canada, the Nova Scotia GPI is being developed by GPI Atlantic, a non-profit research institute, with in-kind assistance and cooperation from Statistics Canada. To this end, GPI Atlantic also sits on the new Sustainable Development Indicators steering committee of the National Round Table on the Environment and the Economy, and it is working with two Nova Scotia communities to develop community-level indicators of genuine progress and well-being. At all three levels -- provincial, national, and community, -- the goal of this work is to provide a practical and policy-relevant tool that can bring vital issues like climate change into our core measures of progress, and particularly to demonstrate the linkages between these issues and long-term economic prosperity and well-being.

Just as assigning 50% to the students' term paper will automatically spur the students to devote time, energy and care to the term paper, so the measurement of population health, security, educational attainment, environmental quality, natural resource health and other variables will naturally spur policy makers to pay attention to the basic non-material values shared by Canadians. If policy makers are "graded" at election time according to their ability to further "genuine progress" and accomplish shared goals and objectives, we will also enter the new millennium with a greater sense of direction and purpose and a keener sense that we are leaving the world a better place for our children than we now have.

Surely we are short-changing ourselves when we determine how "well off" we are by the sum total of the stuff we produce and buy. We have an intuitive sense that we are "worth" more than that and the means now exist to bring that sense of "value" directly into our core measures of well-being. In this way, we can begin to bridge the current chasm between what we know to be important, like the growing evidence of a rapidly changing climate, and the political and social will to take the actions necessary to safeguard the future of our children and future generations.

Climate Change in the Genuine Progress Index

Results from the Nova Scotia GPI Greenhouse Gas Accounts (released September, 2000) will be presented to the Costing Canadian Climate Change workshop in Vancouver, and the full report will be available at the conference September 27-29. The purpose of the GPI greenhouse gas accounts is not to come up with new data sources or costing methodologies, but rather to integrate climate change costs into a core set of economic accounts and measures of progress, using existing data and costing mechanisms. Here is a brief summary of basic results and conclusions in the GPI report that was authored by Sally Walker, Ph.D. More details will be presented at the conference itself.

As its starting point, the Nova Scotia GPI accepts the scientific evidence pointing to:

1. the high correlation of GHG emissions with increasing global temperatures;
2. the capacity of greenhouse gases to trap heat within the earth's atmosphere; and
3. the consequent IPCC conclusion in 1996 that there has been a discernible global warming that is likely due to anthropogenic influences.

That evidence is reviewed in some detail in the GPI report, and the precautionary principle is invoked to conclude that the evidence is too great and potential impacts too severe to ignore that climate change is significant and likely linked to human activities. On that basis, the GPI accepts a reduction in greenhouse gas emissions as a core indicator of "genuine progress."

The chief impacts of climate change that are expected in Atlantic Canada include sea level rise, drought, increase in extreme weather events, and changes in rainfall that can adversely impact our social infrastructure, tourism, fisheries, forestry, agriculture, and ecosystems and water resources.

Total GHG emissions for Nova Scotia in 1997 were 20 million tonnes, an increase of 3% over the 1990 amount of 19.4 million. The major sources of greenhouse gas emissions are related to fossil fuel use for energy (92%). Within the energy use sector, generation of electricity and steam accounts for 42%; transportation for 23%; and residential energy use for 11%.

A wide range of cost estimates are used from different studies to assess both potential climate change damage costs, and also greenhouse gas emission control and mitigation costs. High-end estimates (adopted to conform with the application of the precautionary principle) indicate that greenhouse gas emissions in Nova Scotia over the next 10 years could cause long-term global damage estimated at \$232 billion.

When high-end control costs of \$1,860 million over the same 10-year period are compared, it is apparent that every dollar invested now to curb greenhouse emissions could yield savings of more than \$125 in avoided global damages later. The report itself spells out the assumptions underlying the various calculations. Reasonable short-term targets for reduction of greenhouse gas emissions in Nova Scotia include a low target (Kyoto target) of 3 million tonnes between 2000 and 2010, or a higher target of 5 million tonnes.

To demonstrate the applicability of the macro-level Nova Scotia greenhouse gas accounts to actual policy investment decisions, the GPI study applies its full-cost accounting mechanisms to a case study micro-level cost-benefit analysis of the potential for greenhouse gas emission reductions in one particular sector -- the freight transportation sector. The report recommends that similar applications be made to other sectors to identify the most practical no-regrets and least-cost measures that the province can undertake to reduce greenhouse gas emissions without delay.

To that end, the GPI freight study produced a GHG Mitigation Index, which indicates the net cost or benefit to society of particular GHG reduction measures, when GHG emissions, pollution, accidents, administration, policing, capital and other costs are all taken into consideration. For the freight transportation study, the GHG mitigation index was -\$715 per tonne of GHG emissions reduced. This indicates a net benefit to society of \$715 for every tonne of GHG emission reduction. The study concluded that a 10% shift of freight from truck to rail would result in a benefit to Nova Scotia of \$10 million per year, including avoided air pollution, accident, policing and road infrastructure and maintenance costs. In effect, such a shift not only marginally reduces GHG emissions, but also produces net savings to society in other areas -- a true "no-regrets" measure.

The GPI Greenhouse Gas report also discusses opportunities for the reduction of GHG emissions in electricity and steam generation, transportation, and residential energy use. Opportunities are outlined that could result in a low reduction target of 1.2 million tonnes or a high target of 4.7 million tonnes. The estimated net benefits of the low target are \$2.6 billion over the next ten years, and of the high target, \$5.38 billion.

The GPI study concludes that it is reasonable for Nova Scotia to take the lead in reducing greenhouse gas emissions and to become a model for other jurisdictions to do so. The report recommends that province should:

1. set reasonable and sector-specific targets for GHG emission reductions within the next six months;
2. determine the most cost-effective ways to meet those targets using the cost-benefit mechanisms demonstrated in the GPI report;
3. set up incentives, regulations, taxation and pricing mechanisms to implement the reductions mechanisms; and
4. set up systems for monitoring progress.

At the same time, it is recognized that the province must also examine ways of adapting to the climate change that is likely already headed our way.

GPI Atlantic is confident that the GPI accounting model developed in Nova Scotia is applicable to other jurisdictions interested in developing broader and more comprehensive measures of well-being and genuine progress. Because it uses existing, accepted methods and data sources, it can be easily replicated, maintained and updated.

1. By bringing Canadian climate change costs into core measures of progress that can be used by policy makers to measure sustainable development and assess long-term well-being; and
2. by linking climate change costs, and the value of social, environmental and resource assets to long-term economic prosperity,

it is hoped that the current chasm between the abundant scientific evidence on climate change and the actions required to reduce greenhouse gas emissions substantially can quickly be bridged for the benefit of our children and future generations.