GPI Atlantic
Genuine Progress Index for Atlantic Canada/Indice de Progrès Réal

MEASURING SUSTAINABLE DEVELOPMENT

APPLICATION OF THE GENUINE PROGRESS INDEX TO NOVA SCOTIA

CLIMATE CHANGE

in the

GENUINE PROGRESS INDEX

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1. The Challenge

- Despite the inadequacy of our knowledge on the impacts of climate change, the most serious gap is between what we DO know and our ability to ACT on that knowledge.

- So long as economic growth measures remain the primary social and political benchmark of well-being and prosperity, this gap will not likely be bridged:

1) Fossil fuel extraction and use contribute to the GDP and are thus conventionally counted as contributions to growth and progress.

2) Natural resource depletion remains invisible in the GDP and related economic measures. Because wealth and income are not properly distinguished, selling off natural capital assets registers as gain rather than depreciation.

3) Climate change damages such as storm cleanup expenditures, and adaptation costs like irrigation and flood control, also contribute to the GDP and economic growth, though they do not enhance net well-being.

- The misuse of the GDP to assess prosperity and well-being sends misleading signals to policy-makers, and blunts climate change initiatives.

2. A Better Way to Measure Progress

- By contrast, the Genuine Progress Index attempts to bridge that gap by including climate change as one of 22 core components in a more accurate and comprehensive measure of well-being and progress.

- In the Genuine Progress Index (GPI):

1) Natural resources are seen as capital assets subject to depreciation and requiring re-investment.

2) Climate change adaptation costs are counted as "defensive expenditures" rather than net contributions to well-being.

3) A reduction in greenhouse gas emissions is a sign of progress that makes the index rise. Unlike measures based on the GDP, "less" is sometimes "better" in the GPI.

- Indicators are powerful. They reflect social values, and they help determine what makes it onto the policy agenda.

- Unless incorporated into a set of *core* measures of progress, scientific evidence, state of the environment reports, and "satellite" natural resource accounts will always remain on the periphery of the policy arena.

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

Time Use:
* Economic Value of Civic and Voluntary Work
* Economic Value of Unpaid Housework and Child Care
* 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:
* Population Health and Health Care
* Educational Attainment
* Costs of Crime
* Human Freedom Index

3. Moving the GPI into the Policy Arena

- The Nova Scotia Genuine Progress is a pilot project for Canada: Ongoing collaboration with Statistics Canada.

- GPI Atlantic is a member of the steering committee of the National Round Table on the Environment and the Economy that is charged with creating a set of national indicators of sustainable development.

- Two pilot community-level GPI projects in Nova Scotia include assessments of household energy and transportation use to measure progress in reducing GHG emissions at the local level.

- THEREFORE, at the national, provincial and community levels, the GPI can provide a practical, policy-relevant tool that can help bring climate change into our core measures of progress.

4. The Nova Scotia GPI Greenhouse Gas Accounts

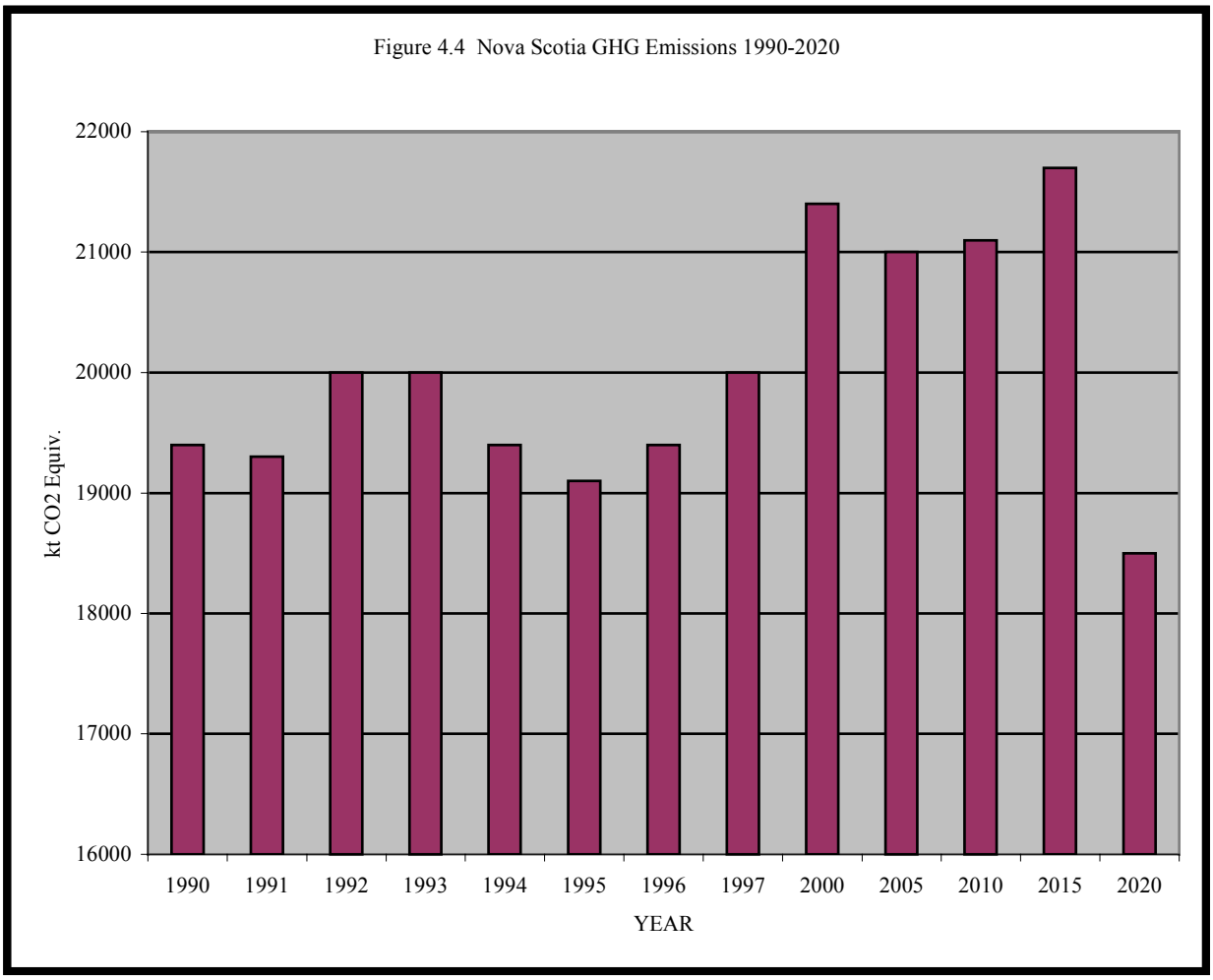
- No new methodologies or data sources, but use of existing data and costing mechanisms.

- Fundamental principles include the precautionary principle and full-cost accounting.

- Intended as an educational tool, the GPI therefore begins with a review of the scientific evidence in lay terms and on the potential impacts of climate change in Atlantic Canada on:
  a) sea level rise,
  b) drought,
  c) increase in extreme weather events and changes in rainfall,
  d) social infrastructure,
  e) tourism,
  f) fisheries,
  g) forestry,
  h) agriculture,
  i) ecosystems and
  j) water resources.

- The GPI Greenhouse Gas Accounts then assess trends in GHG emissions, and the economic costs of climate change damages, emission controls, and emission reduction strategies. Here are some examples:

GHG Emissions, Nova Scotia, 1990-2020



Note that the projected 12% decline in emissions by 2020 represents conversion to natural gas. The GPI report makes clear that the fortuitous discovery of natural gas at this historical juncture does not absolve the province from taking actions to reduce its greenhouse gas emissions in energy consumption, transportation and other sectors.

Global Damage Costs of Nova Scotia's Current Annual GHG Emissions by Sector:

Low Estimate (Cline)**: $760 million**
High Estimate (Bein and Rintoul)**: $21 billion**

GREENHOUSE GAS SOURCE AND SINK CATEGORY	TOTAL $ktCO_2$ eq.	Cost (mil) @ $1,040 (Bein)	Cost(mil) @ $38 (Cline)
ENERGY:			
Fossil Fuel Industries	649	$675	$25
Electricity and Steam Generation	7,720	$8,029	$293
Mining	41	$43	$2
Manufacturing	701	$729	$27
Construction	30	$31	$1
Transportation: Land Vehicles	4,252	$4,422	$162
Transportation: Air/Marine/Rail	1,090	$1,134	$41
Residential	2,100	$2,184	$80
Commercial & Institutional	942	$980	$36
Other combustion	250	$260	$10
Fugitive Gases	690	$718	$26
ENERGY: TOTAL	**18,465**	**$19,204**	**$702**
Industrial Processes	270	$281	$10
Solvent & Other Product Use	14	$15	$1
Agriculture	580	$603	$22
Land Use Change and Forestry	15	$16	$1
Waste Total	660	$686	$25
TOTAL	**20,000**	**$20,804**	**$760**

Note: Totals may not always reflect sums of numbers in the table, due to rounding.

Control Costs of Reducing GHG emissions: Low and High Targets for Nova Scotia by 2010

Low target represents Kyoto goal for Canada: 6% below 1990 levels.

High target is based on David Suzuki goal of 50% reduction within 30 years.

Control Costs of Reducing GHG emissions (in millions of dollars).

Target		cost @ $10/tonne	cost @ $35/tonne	cost @ $124/tonne
LOW	3 million tonnes	$30	$105	$372
HIGH	15 million tonnes	$150	$525	$1,860

Conclusion: It pays to control emissions. A dollar invested in reducing emissions now can save $8.40 in avoided global damages later.

CO_2 Eq. Reduction 2000-2010 (tonnes)	**Low Estimate**	**High Estimate**
3 million tonnes		
Damage Avoidance	$120 million	$3.1 billion
Control Costs	$ 30 million	$372 million
Ratio: Damage Avoidance: Control	4:1	8.3:1
5 million tonnes		
Damage Avoidance	$190 million	$5.2 billion
Control Costs	$ 50 million	$620 million
Ratio: Damage Avoidance: Control	3.8:1	8.4:1

Some Potential GHG Emission Reduction Strategies for Nova Scotia ('000 tonnes)

Sector	Target: 6% below 1990	Projected Emissions in 2010	Reduction to be achieved by 2010	Reduction or increase		Measure
				High	Low	
Electricity Generation	6,436	7,700	1,264		445	NSP: planned/in-place
				-878		NSP: under investigation
Residential	2,162	~2,500	338	-2200	-1013	Table 6.2
Transportation	4,888	6,400	1,512	-14.9	-14.9	Freight modal shift
				-1600	-640	Passenger: reduce 10-25%
TOTAL	**13,486**	**16,600**	**3,114**	**-4692.9**	**-1222.9**	

(NSP = Nova Scotia Power)

- As an appendix, the GPI greenhouse gas accounts conclude with a detailed 67-page cost-benefit analysis of potential GHG reductions by shifting 10% of existing freight from road to rail.

- When avoided accidents, air pollution, infrastructure, maintenance and other costs are considered, the results find a $10 million gain to Nova Scotia. This illustrates a "no regrets" measure that can reduce GHG emissions, cut costs and produce a net social benefit.

The appendix also illustrates the applicability of the GPI method at the micro-level, and demonstrates the utility of full-cost accounting mechanisms to evaluate alternative greenhouse gas reduction strategies. It shows the potential to identify other no-regrets measures that can be adopted without delay.