

---

# REDUCTION OF GREENHOUSE GAS EMISSIONS IN THE NOVA SCOTIA FREIGHT TRANSPORT SECTOR

## EXECUTIVE SUMMARY

The impetus for this study arose from the desire of leaders in several Nova Scotia Government Departments to 1) take a proactive stance on reduction of greenhouse gases and 2) to find a method for analyzing the impact of various GHG reduction strategies on the environmental, social and economic health of the province. The overall objective is to determine the usefulness of the Genuine Progress Index approach for analyzing and comparing costs and benefits of various greenhouse gas reduction scenarios. Specifically, the study sought to produce a Greenhouse Gas Mitigation Index, which would be a measure of the cost to reduce CO<sub>2</sub> emissions by one tonne in the truck and rail freight transportation sector in Nova Scotia.

The study analyzed for-hire truck traffic and mainline rail traffic along the corridor from Halifax, N.S. to Amherst, N.S. in an effort to determine the potential for GHG emissions reduction through a modal shift of freight from truck to rail. Because the study relied on available statistics, namely Statistics Canada catalogues “Rail in Canada” (which aggregates data for Atlantic Canada) and “Trucking in Canada” (which only includes for-hire trucking companies with annual income greater than \$1 million), data limitations were substantial.

Costs and benefits included in the study were property tax; fuel tax; registration fees; license fees; toll fees; infrastructure costs (capital and maintenance); policing costs; administrative costs; costs of air pollution and climate change; accident costs; and costs of fossil fuel depletion. The Income and Expense Statements for Truck and Rail (below), under the Business-as-Usual Scenario and under a Modal Shift from truck to rail, summarize the net societal costs of trucking and rail for the HA-800 freight. Under the business-As-Usual Scenario, net societal costs for trucking are six times those for rail.

The current (1997) modal mix for long-haul freight between Halifax and Amherst is 67% rail and 32% truck. Because the potential for shifting freight from truck to rail is limited by the type of freight shipped, the maximum modal mix possible is 77% rail and 23% truck, which is the recommended modal mix. The change to this modal mix would save roughly \$141 million over the 14 years represented here. The cumulative reduction in CO<sub>2</sub> emissions was estimated at 191,750 tonnes. A 10% shift of freight away from truck toward rail would result in an average annual decrease in CO<sub>2</sub> of 13,696 tonnes at a net average annual social benefit of \$10 million.

The GHG Mitigation index is estimated at -\$715 per tonne of CO<sub>2</sub>. It is noted that the recommended modal shift would cause a decrease in total employment remuneration of 12.3%, and trucking remuneration is reduced by 30%.

The modal shift of 10% truck freight to rail is considered a “No Regrets” measure, since it results in net benefits to society. However, it is not a significant measure in the overall challenge of greenhouse gas reduction in Nova Scotia.

The GPI approach to GHG reduction strategies was found to be highly useful and applicable for many different scenarios. The GHG mitigation index allows a means of comparing the effectiveness of many different strategies.

<b>INCOME AND EXPENSE STATEMENT, 1997</b>		
<b>BUSINESS-AS-USUAL SCENARIO</b>		
<b>HA-800 Truck and Rail Freight</b>		
	<u>Truck</u>	<u>Rail</u>
<b>Revenues to Society</b>		
Government Revenues		
- Property Tax		\$1,000,000
- Diesel Fuel Tax	\$607,867	\$321,110
- License Fees	\$50,444	
- Registration Fees	\$529,000	
- Toll Fees	\$2,820,000	
<b>Total Societal Income</b>	<b>\$4,007,311</b>	<b>\$1,321,110</b>
<b>Expenses to Society</b>		
Government Costs:		
- Highway Capital Costs	\$1,788,569	
- Highway Maintenance Costs	\$570,469	
- Policing Costs	\$3,295,900	
- Administrative Costs	\$14,568,200	
External Costs		
- Accidents	\$3,782,720	\$1,151,864
- Air Pollution	\$7,224,174	\$2,357,617
- Climate Change	\$1,656,996	\$513,624
- Fossil Fuel Depletion	\$4,921,648	\$2,652,319
<b>Total Societal Expenses</b>	<b>\$37,808,672</b>	<b>\$6,675,752</b>
<b>NET PROFIT (EXPENSE)</b>	<b>(\$33,801,361)</b>	<b>(\$5,354,642)</b>
<b>SUM Net Expense Rail and Truck</b>	<b>(\$39,156,003)</b>	
<b>NOTES to INCOME STATEMENT:</b>		
<i>Numbers may not agree exactly with text numbers due to rounding.</i>		
<i>Total societal income and expenses refer only to those categories included in the study</i>		

<b>INCOME AND EXPENSE STATEMENT, 1997</b>		
<b>RECOMMENDED MODAL MIX SCENARIO</b>		
HA-800 Truck and Rail Freight		
	<u>Truck</u>	<u>Rail</u>
<b>Revenues to Society</b>		
Government Revenues		
- Property Tax		\$1,239,084
- Diesel Fuel Tax	\$424,159	\$397,934
- License Fees	\$35,203	
- Registration Fees	\$369,131	
- Toll Fees	\$1,967,761	
<b>Total Societal Income</b>	<b>\$2,796,255</b>	<b>\$1,637,019</b>
<b>Expenses to Society</b>		
Government Costs:		
- Highway Capital Costs	\$1,248,033	
- Highway Maintenance Costs	\$398,051	
- Policing Costs	\$2,299,824	
- Administrative Costs	\$10,165,447	
External Costs		
- Accidents	\$2,639,519	\$1,427,305
- Air Pollution	\$5,040,907	\$2,921,385
- Climate Change	\$1,156,224	\$636,444
- Fossil Fuel Depletion	\$3,434,244	\$3,286,558
<b>Total Societal Expenses</b>	<b>\$26,382,250</b>	<b>\$8,271,692</b>
<b>NET PROFIT (EXPENSE)</b>	<b>(\$23,585,996)</b>	<b>-\$6,634,673</b>
<b>SUM Net Expense Rail and Truck</b>	<b>(\$30,220,669)</b>	
<b>NOTES to INCOME STATEMENT:</b>		
<i>Numbers may not agree exactly with text numbers due to rounding.</i>		
<i>Total societal income and expenses refer only to those categories included in the study</i>		