

# **Health Effects of Hydrogen Fuel Substitution in Public and Private Vehicles in the Greater Toronto Area**

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Environmental Applied Science and Management  
Master of Applied Science, 2005  
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## **ABSTRACT**

Early in the research process it was recognized that the relationship between percent reduction in emissions from individual sources, in particular the transportation sector, and proportional reduction in health care costs, was unknown. To address this deficiency, this study estimated whether (or not) investment in a conversion to hydrogen-based transportation, would be justified given the number of lives saved and the reductions in health costs in the GTA. Using available ambient air pollution, emission inventory, and socioeconomic data, the contribution of the GTA's transit bus fleet and its private light duty vehicles (LDV) to local O<sub>3</sub> and PM was determined. After using these relative contributions to estimate future air pollutant concentrations, the OMA's Illness Costs of Air Pollution (ICAP) model was used to forecast the potential reductions in health costs. Despite a number of resource limitations, data gaps and scientific uncertainties, the primary objectives of this project were met. The preliminary estimates generated suggested that the economic benefits of converting the GTA bus fleet alone would not justify the expense and other reduction factors would have to be considered. Also a total (100%) conversion of light duty vehicles would be required to realize a meaningful (10%) reduction in health costs. While substantial savings would be incurred in the range of \$500 million annually in the GTA alone, it remains to be seen how this would compare to the costs of conversion for vehicles and infrastructure.