



Achieving Sustainable Transportation in the Toronto Region

In the Greater Toronto and Hamilton area (GTHA), there is growing recognition that significant changes in the region's transportation system are needed in order to achieve sustainability in transportation, and to address economic and social deficiencies inherent in the current system. Among the issues faced by residents and commerce in the region are:

- The need to reduce emissions of greenhouse gases (GHGs) and toxins from transportation sources;
- An energy future marked by uncertain and constrained supplies;
- The need to reduce private and public costs of travel overall, especially as energy prices rise;
- The need to reduce motor vehicle traffic on roads, even as populations increase rapidly;
- The need to reduce the incidence of death, injury and trauma resulting from travel by automobile;
- The need to reduce inefficiencies in the transportation of people and goods;
- A multi-billion dollar annual economic loss to Ontario from the importation of motor fuels and motor vehicles;
- Land use practices that increase distances between trip origins and destinations, and the need to travel by personal automobile.

Environmentalists have long argued that environmentally sustainable transportation systems help to resolve these issues to varying degrees, by reducing travel demand, shifting passenger travel away from automobiles, and by improving the efficiency of goods movement.

A widely-accepted definition of sustainable transportation, developed in the late 1990s by Canada's Centre for Sustainable Transportation is that it is a system that:

- Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations;
- Is affordable, operates efficiently, offers choice of transportation mode, and supports a vibrant economy;
- Limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.

Achieving sustainability in transportation supports the Kyoto Accord treaty obligations to reduce greenhouse gas emissions. For Canada, meeting Kyoto treaty obligations means reducing projected 'business as usual' CO₂ emissions by 50% by 2012¹. Climate stabilization will require additional reductions in subsequent stages. Because transportation is responsible for about 25% of all greenhouse gas emissions in Canada, and a wide variety of waste products, dramatic changes in the way the transportation system works to move people and goods will be needed if sustainability is to be achieved.

Moving people: The Magnitude of Change

Achieving an environmentally sustainable transportation system in the GTHA means reducing the number of kilometres traveled by personal automobile through at least two overall strategies:

- Dramatically increasing the ratio of trips taken by municipal and regional transit;
- Increasing the number of trips taken by walking and cycling.

The magnitude of the effort needed to increase the ratio of transit trips is illustrated by growth projections for the GTHA. Between 2006 and 2031, the region's population will grow by 2.3 million² and, based on historical trip lengths and rates, the total number of daily vehicle-kilometres will increase by more than 39% – a theoretical increase that cannot be accommodated without dramatic changes in the transportation system. However, in this scenario, if the average fuel efficiency of all vehicles also increases by 39% by 2031, greenhouse gas emissions from trips would remain at about 2006 levels. Given that a 39% reduction from 2008 levels is needed to achieve even the short term GHG treaty emission reduction targets¹, other transportation efficiency measures are needed. For urban and regional passenger transportation, this means reducing trip lengths and the total number of trips taken by automobile, and implementing major expansions to public transit services.

Many transit expansion scenarios are possible, any of which can have dramatic implications. As an example, if the number of trips taken by automobile in the GTHA is reduced by 39% by 2016 (compared to 2006), and the percentage of trips taken by walking and cycling rises to 10% of all trips (from about 6.4% today), the number of trips by transit would have to almost triple. The financial investments needed to achieve this shift would vary according to the mix of transit modes chosen. A basic bus-only scenario providing local and express services could cost about \$5.0 billion in capital start-up costs and, by 2016, and require an annual net operating subsidy of roughly \$550 million.³ Adding municipal and regional rail-based services can multiply infrastructure development costs by a factor of 3 or more.

Yet although the investment figures for the bus-only scenario appear high, the capital cost, when spread evenly over nine years (2008 to 2016), is \$544 million per year, or \$83 per GTHA resident. Net operating subsidies would grow over the years to reach \$76 per capita in the year 2016. Implementing rail-based transit (subways, light rail) would increase upfront capital investment costs considerably but, depending on configuration and location, these services are likely to be needed to attract levels of ridership needed to contain or reduce road congestion.

Importantly, the affordability of travel for households should be entered into the decision equations of governments. Although the public expenditure for transit may appear high, the overall offsetting savings to households, as they reduce dependence on private transportation (their cars), are far greater. As energy prices climb, so does the overall financial benefit of public transit investments.

For new communities, achieving sustainability in transportation will require land use patterns characterized by a very close mix of residential and non-residential uses. Increasing the mix of uses – and overall densities – reduces trip lengths, enabling shifts to walking and cycling as travel modes. Given a target of a 39% reduction in trips by automobile, reducing the amount of land area allocated for the operation and storage of private automobiles is also appropriate.

Can transit ridership in the GTHA increase by 200% – to 35% of all daily trips – by 2016? A number of factors work in support of this target:

- The personal affordability of driving is likely to decrease as gasoline prices increase rapidly;
- Road congestion encourages drivers to look for alternative travel modes;
- Improved availability and quality of transit services, especially outside the city of Toronto;
- Transit-supportive land use patterns in new communities;
- Environmental imperatives and political leadership in support of sustainability.

Moving Goods

Traffic congestion on roads in the GTHA, rapid increases in the price of motor fuels, and emissions of greenhouse gases and pollutants will spur significant efficiency measures in the trucking industry. Obligations under the Kyoto Accord can almost certainly not be met unless GHG emissions

from truck transportation are also dramatically reduced, because emissions per vehicle from trucks are far higher than for automobiles. Efficiencies at the regional and local level can include:

- More load-sharing, freight transit systems, and better trip planning to minimize total trips;
- Reallocating some mixed traffic lanes on highways to freight-only;
- Moving longer distance goods movement to rail or water-based transportation;
- Using incentives and disincentives to foster purchases of more fuel-efficient vehicles and technologies that minimize emissions (e.g. hybrid and electric vehicles).

Sustainability also requires that land consumption for additional roads to accommodate goods movement not occur.

Reaping What We Sow

The current rate of investments in public transit as planned by public officials is highly unlikely to produce the modal shifts necessary to stem environmental decline, traffic congestion, or rising travel costs for GTHA households and business. Sustainability requires greater change. Additionally, current density targets for the urbanization of greenfield lands (50 residents and jobs per gross hectare) are too low to support an adequate shift to public transit and non-motorized modes of travel. If current plans continue unchanged, modal shares for travel by automobile, transit and non-motorized means are likely to remain unchanged.

However, achieving sustainable transportation in the GTHA will produce substantial benefits: reduced travel costs for households, avoidance or lessening of traffic congestion and gridlock, fewer deaths and injuries from transportation, reduced exposure to energy price shocks, cleaner air, reductions in respiratory ailments, improved personal health from walking/cycling, a stronger economy from reduced imports of vehicles and fuels, less rural land lost to pavement as the region grows, and success in meeting critical climate stabilization goals.

1. Canada's Energy Outlook: Reference Case 2006; Natural Resources Canada;
<http://www.nrcan.gc.ca/com/resoress/publications/peo/peo2006-eng.pdf>, p.55.

2. Places to Grow population and employment projections; <http://www.pir.gov.on.ca/english/growth/gghdocs/FPLAN-ENG-WEB-SCHED3.pdf>

3. Capital costs based on .971m additional daily peak period transit trips divided by 131 riders per bus x \$600,000 per bus, + 10%. Net operating deficit is based on 7,417 buses X (\$250,000 annual operating cost per bus x 30%).

SUDA is a registered Canadian charitable organization whose mission it is to foster a healthy natural environment through education about sustainable city-building, by providing information in the Toronto region through outreach, research and analyses, networking and electronic communications. Your financial contributions in support of our work are welcome, and can be made through www.suda.ca.

