

Backgrounder: Highway Speeds and Greenhouse Gas Emissions Reductions

Background:

- The fuel economy of a vehicle varies with the speed of the vehicle. The fuel economy of current vehicles is maximised at speeds between 50 and 90 km/h; at higher speeds increased aerodynamic forces reduce fuel economy, and at lower speeds the fuel required to keep the engine running is greater.
- In Alberta many highways have posted speed limits above 90 km/h, typically 100 or 110 km/h. Furthermore, a considerable portion of highway traffic occurs above posted speed limits.
- For posted speeds of 90 km/h the proportion of vehicles above the speed limit is sufficient to provide fuel economy improvements if the speed limit is observed, reducing GHG emissions.
- For highways with posted speeds of 100 or 110 km/h average speeds are often above the posted speed limit. Observance of posted speed limits would produce significant savings in fuel economy and GHG emissions.
- RCMP traffic analysis at a highway location with a posted speed limit of 100 km/h found that 64.4% of vehicle traffic exceeded the posted speed limit. At a similar location with a posted speed limit of 110 km/h 34.2% of vehicle traffic exceeded the posted speed limit. For both of these locations vehicle speeds ranged from less than 70 km/h to more than 191 km/h.
- Reducing highway speed limits from 100 or 110 km/h to 90 km/h would reduce fuel and maintenance costs, but not without considerable increases in time costs and the cost of enforcement, which significantly increases the cost per tonne of GHG reduction.

Highway Speed Limit Scenarios:

Observing current highway posted speed limits:

- Observing/enforcing current highway posted speed limits is estimated to generate an 85 megatonne reduction of GHG emissions from 2001 to 2020 for Canada. The effectiveness of observing current posted speed limits is dependent upon the compliance of motorists and the enforcement capabilities of police. Further research at the provincial level would be required to better understand what would be the GHG mitigation potential solely for Alberta and the costs and benefits involved.
- The cost of enforcement is estimated at \$100 million per annum for Canada. This equals a cost per tonne of GHG reduction of \$10, which would increase as compliance deviates from 100%. As compliance falls, so do reductions in GHG emissions.
- Overall, the savings in fuel and maintenance costs are balanced by time costs; thus increased enforcement cost is the effective cost for reducing vehicle speeds to current posted speed limits.

Observing reduced highway posted speed limits:

- Observing/enforcing reduced highway posted speed limits is estimated to generate an additional 77 megatonne reduction of GHG emissions from 2001 to 2020 for Canada. Again, compliance and enforcement are crucial, as is Alberta-specific research. The distribution of vehicle speeds varies by province and highway, impacting enforcement costs and the likelihood of compliance.
- Reducing highway speed limits would involve substantially higher enforcement costs, as a greater proportion of vehicle operators would be affected, notably in Alberta where 77% of roads have posted speed limits of 100 and 110 km/h. Total enforcement costs are estimated at \$200 million annually for Canada, which equates \$1.7 billion over 20 years. Additional costs would be realised for changing all affected signage.
- When speeds are reduced to 90 km/h, time costs are not offset by fuel and maintenance cost savings. The magnitude of these savings diminishes as speed decreases.
- Total cost of time lost for Canada is estimated at \$1.3 billion annually, while total fuel and maintenance savings would amount to \$800 million per annum. This results in a net cost of \$500 million annually.
- The net cost per tonne of GHG reduction is estimated at \$54. This cost will increase incrementally as compliance decreases, which will be accompanied by lower levels of GHG mitigation.

Key Issues/Considerations:

Composition of roads in Alberta by posted speed limit:

- 92.4% of primary highways in Alberta have posted speed limits over 90 km/h; 83.7% are at 100 km/h and 8.7% are at 110 km/h.
- 62.4% of secondary highways in Alberta have posted speed limits of 100 km/h. The remaining 37.6% is posted at 90 km/h or less.
- Of the total provincial highway kilometres (30,500 km) 77.3% have posted speed limits over 90 km/h; 4.3% is posted at 110 km/h and 73.0% is posted at 100 km/h.
- In addition to the percentage of provincial highway with posted speeds above 90 km/h, careful consideration must also be given to the volume of traffic on these roads. This will increase the cost of enforcement and the potential for non-compliance.

Safety Issues:

- It is not entirely clear if there would be any significant accident cost savings associated with lower speeds. While it is generally believed by the public that lower speeds promote safety, research has shown that decreased speed alone does not improve safety.
- If highways with current posted speed limits of 100 and 110 km/h were reduced to 90 km/h, it would likely produce greater variance in vehicle speeds among highway users thereby diminishing safety. The speed differential is a safety concern.

Advances in vehicle technology:

- There has been a general trend in changes to vehicle operating efficiency; the range of optimum fuel efficiency, which is now between 50 and 90 km/h, has both increased and broadened over time.

Competitiveness Issues:

- Objections could come from groups/firms arguing that current speeds are required to remain competitive across jurisdictions.

Other Issues:

- If the key Alberta trucking stakeholders pursue reduced highway speeds for trucks, and research can be gathered establishing that this would not compromise highway safety, the potential exists for the trucking establishment to engage in self-regulation. All trucks built after 1995 come equipped with systems designed to monitor and regulate vehicle speed.
- Driver behaviour is extremely resistant to change; without stepped-up enforcement there is no incentive (credible threat) for drivers to modify their driving habits.
- Any widespread role for photo-radar on Alberta highways could conflict with the province's current stance on the issue.