August 2010

Preliminary Report

Bridging the Gulf

Changing the way Ontarians commute will cut oil demand, protect the environment and save money

by Cherise Burda, Alison Bailie and Graham Haines

The link between Ontario's oil demand, oil spills and oil sands impacts

The Deepwater Horizon oil spill in the Gulf of Mexico is the worst oil spill in North American history. For 108 days, Ontarians watched helplessly, along with the rest of the world, as 5 million barrels of oil gushed unrelenting into the ocean, destroying vast amounts of sea life along with a way of life for the people of the coast.

What many haven't seen in the spill footage is the connection between the choices we make every day, and the impacts of oil production.

The growing demand for oil from consumers in North America, including here in Ontario, drives the type of activity that led to the BP oil spill in the Gulf — as well as the most recent Enbridge pipeline spill, which released one million gallons of oil into Michigan's Kalamazoo River last month, and countless other spills that happen around the world each year.

In Canada, oil sands operations are expanding, and so are the environmental consequences of such development. Oil sands are a sticky mixture of sand, water, clay and bitumen that can only be processed using massive amounts of energy. Producing one barrel of oil from oil sands mining requires excavating an astonishing four tonnes of material[2] and so far has produced 840 billion litres[3] of toxic waste in the form of liquid tailings. Oil sands development is proceeding prior to adequate rules being in place to protect the environment.

At a Glance

The five personal transportation solutions outlined in this report can reduce Ontario's demand for oil.

Less demand means less exploration and extraction — and less oil and toxic byproducts polluting oceans, rivers, lakes and ecosystems.

As U.S. President Barack Obama said recently[1] in reference to the Gulf oil spill: "The tragedy unfolding on our coast is the most painful and powerful reminder yet that the time to embrace a clean-energy future is now."

For instance, Alberta oil company Syncrude was recently found guilty of failing to prevent migratory birds from landing in its toxic oils sands tailings ponds — negligence that, in April 2008, resulted in the deaths of 1,600 ducks.

The BP disaster and environmental impacts from oil sands development are both symptoms of the same problem. Oil is a finite resource that is getting more difficult and expensive to extract, and the environmental risks of producing oil are on the rise. Now that Deepwater Horizon has finally been capped and plugged, and the Enbridge spill has been contained, politicians in Canada and the U.S. are asking how to prevent future disasters from happening. Answering that question means we must consider how we can reduce the amount of oil we consume.

It's true that for the past century, oil has driven unprecedented economic prosperity and shaped our current way of life. And reliance on oil will continue for some time. What is needed today are actions and commitments to begin reducing oil demand and spark a transition to alternatives that are not only safer and cleaner, but stimulate jobs and economic growth here at home.

From the Gulf of Mexico to gridlock in Ontario

Here in Ontario, far away from the Gulf of Mexico, we are "gridlocked" in a level of oil consumption that sees the province spending $15.6 billion [4] every year to import oil, which is mainly used to fuel our vehicles. If Ontario could develop solutions to even modestly reduce the amount of transportation oil we use and import, the money could be kept in the province and invested in alternative transportation technology and manufacturing — like the electric buses that are made in Quebec for the roads of Quebec.

Other countries are already moving in that direction. Israel and Denmark, for instance, have committed to ending their dependence on oil as an energy source and are making the game-changing investments to get there. But even just reducing our use of oil can make a difference.

The good news for Ontarians is the we can also make changes to reduce our dependence on oil — and those changes will have a

Ontario oil demand by the numbers

Oil spilled into the Gulf of Mexico from the Deep Horizon well:
5 millon barrels over 108 days
In other words…
Enough oil to fuel 20% of the personal vehicles on Ontario roads for the duration of the spill

Ontario's annual oil imports:
192 million barrels[5]
In other words…
12,000 Olympic swimming pools a year — 40 times the amount of oil spilled from Deepwater Horizon

Dollars that leave Ontario every year in oil imports:
$15.6 billion/year[6]

Cost of implementing the Metrolinx transportation plan:
$2 billion/year[7]

One barrel of oil…

- = 159 litres
- = 3 tanks of gas (avg. size car)
- = 2.7 kegs of beer

positive impact on the economy and our quality of life. In this report we present five key actions Ontario could make to bridge the gulf between where we are today, and where we could be.

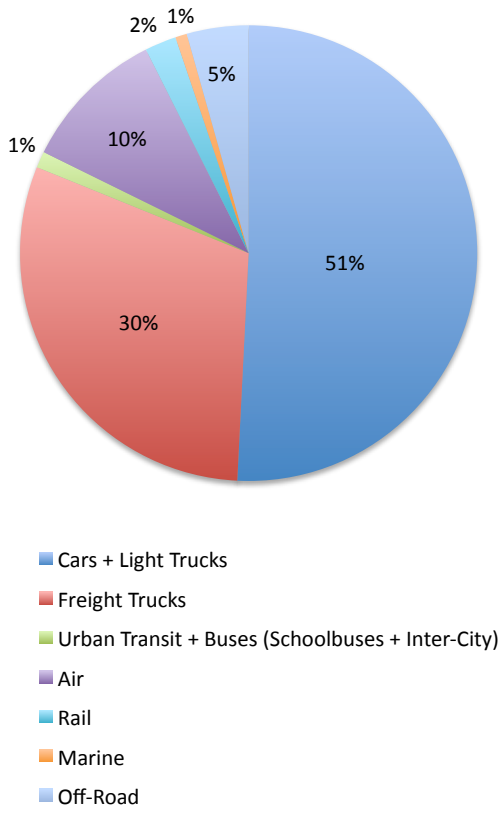
Lining up at the Pump

Ontario consumes a third of all the refined petroleum in Canada, over 80 per cent of that oil is used by the transportation sector.[8] Out the tailpipe, Ontario's transportation sector emits nearly a third of the province's greenhouse gases (GHG), making it the largest source of GHG emissions in the province.[9] In fact, burning oil for transportation is expected to be the largest and fastest growing source of Ontario's GHG emissions for years to come.

But here's the key: half of the oil consumed for transportation is burned in the engines of all the cars, SUVs and minivans and other personal vehicles crowding Ontario's roads as people commute to work or school and go about their business every day.[10]

Ontario's 7 million cars and light trucks (such as SUVs and pickups) consume 86 million barrels of oil every year.[11] And it doesn't stop there — we can expect to see approximately 2.5 million more cars and light trucks added to Ontario's roads over the next 25 years, resulting in increased GHG emissions, fuel consumption and local pollution, and adding strain to already untenable traffic congestion in urban regions.

Figure 1: Distribution of oil use in Ontario by transport mode



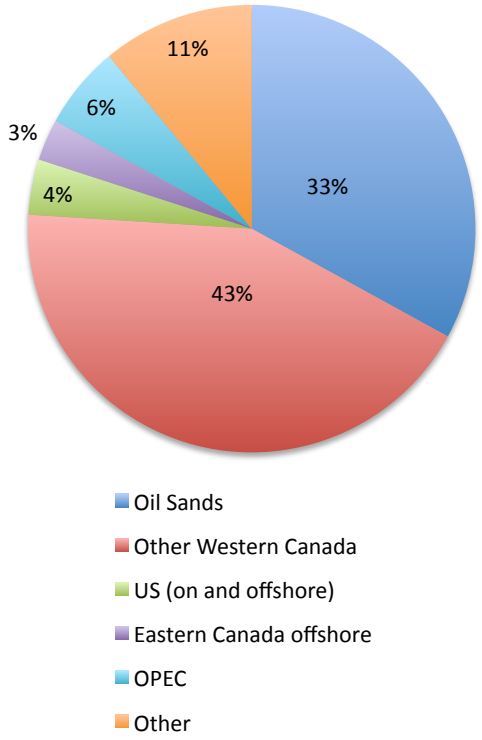
Stuck in Traffic

No commuter can escape Toronto's transportation troubles, whether stuck in gridlock on the 401 or watching three trains pass by a jammed subway platform during rush hour. The Toronto region suffers from the worst traffic congestion in North America, with an average commute time of 80 minutes. Direct annual costs of congestion exceed $3.3 billion.[12]

Growth in the Greater Toronto and Hamilton Area is occurring twice as fast as the supply of roads and 2.5 times faster than transit capacity. It's hard to imagine traffic getting any worse. But it will, as the area is expected to grow by another 2.5 million people and have 1.4 million additional personal vehicles between 2009 and 2031.[13]

It's even worse in the Greater Golden Horseshoe region, which can expect to see another 3.2 million people and an additional 1.8 million vehicles.[14]

Figure 2: Where Ontario's crude comes from*



*yearly numbers based on a five year average from 2005–2009

Five actions to reduce Ontario oil demand

Ontario is in an excellent position to reverse its oil demand. The province already has land use planning and transit initiatives in place, which, if funded and strengthened, can make a significant impact. Ontario also has adopted fairly ambitious GHG reduction targets and tasked a climate secretariat with trying to meet them — and both initiatives support a transition to cleaner transportation. The reduction of gasoline-fueled transportation is further supported by Ontario's shift towards a green electricity grid that can power electric vehicles.

This report examines five key actions that Ontario can implement now to start reversing the trend of growing fuel consumption, traffic congestion and worsening air pollution, particularly in the Greater Golden Horseshoe region and Greater Toronto and Hamilton Area.

Those five actions are:

- Fully fund and implement Metrolinx's the Big Move transportation plan.
- Improve and implement the Growth Plan for the Greater Golden Horseshoe.
- Adopt a package of "Commuter Choice" policies to reduce traffic congestion in the Greater Toronto and Hamilton Area.
- Achieve 5% electric vehicles by 2020.
- Encourage the purchase and manufacture of more fuel-efficient vehicles.

Together, these five actions would cut oil demand from Ontario's personal vehicles by nearly one quarter in 20 years — and that's just through existing policies and programs that simply need to be expanded, strengthened, funded or complimented by other policies. Pembina is conducting a more detailed study to identify a broader and more comprehensive suite of personal transportation policies that can be implemented in Ontario to further reduce oil demand. The five actions outlined in this report represent feasible and existing personal transportation policies that the Ontario government can act on now to begin reducing the province's consumption of oil today.

> These five actions would cut oil demand from Ontario's personal vehicles by nearly 25% in 20 years — just through policies and programs that are either in the works or being considered.

Note that this study focuses on personal transportation. Pembina recognizes that a similar study related to freight vehicles is needed, but it is not possible to include within the scope and capacity of this report.

Gasoline by geography

Ontario

13 million people

7,300,000 cars

192,000,000 barrels of oil/ year

Greater Golden Horseshoe

8.8 million people (67% of Ontario's population)

4,900,000 cars

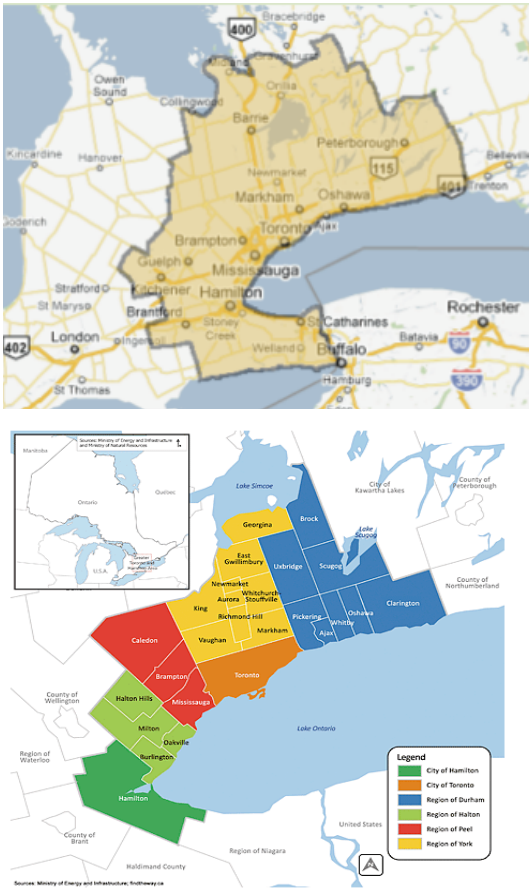
130,000,000 barrels of oil/year

Greater Toronto and Hamilton Area

6.6 million people

3,700,000 cars

97,000,000 barrels of oil/ year



Maps: The Greater Golden Horseshoe region (upper) and the Greater Toronto and Hamilton Area (lower)[15]

Table 1: Five actions and resulting reductions to oil demand

Clean Transportation Actions	Oil savings 2020 (million barrels/year) (% savings from personal transportation)	$ Imports Saved 2020 (millions/year)	Oil Savings 2031 (million barrels/year) (% savings from personal transportation)	$ Imports Saved 2031 (millions/year)
1 - TRANSIT: Metrolinx's *The Big Move* fully funded and implemented	3,900,000 5.1%	$307	5,100,000 7.8%	$448
2 - URBAN PLANNING: Improved Growth Plan for the Greater Golden Horsehoe Region	800,000 1.1%	$63	1,200,000 1.7%	$91
3 - COMMUTER CHOICE POLICIES: A package of commuter choice incentives and road-pricing policies	4,100,000 5.3%	$321	3,900,000 5.5%	$309
4 - ELECTRIC VEHICLES: Achieving Ontario's ambition for 5% electric vehicles by 2020	3,800,000 5.0%	$301	3,600,000 5.0%	$282
5 - MORE FUEL-EFFICIENT VEHICLES: Combining new federal standards with market-based incentives				
5a. Proposed federal vehicle GHG emissions regulations (Extended and improved beyond 2016)	300,000 0.4%	$25	4,500,000 6.2%	$349
5b. Incentives to encourage more fuel-efficient vehicles (i.e. feebates)	900,000 1.2%	$74	1,100,000 1.6%	$85
TOTAL COMBINED SAVINGS*	12,600,000 16.4%	$990	17,400,000 24.3%	$1,369

*Total combined is not equal to the sum of policies since there are interactions between policies. The combined impact of these five provincial policies is calculated for all of Ontario (along with proposed federal vehicle regulations) although a number of the policies are applicable only to specific geographic areas. These include the Greater Golden Horseshoe region, which is the planning area for Ontario's main urban planning policy, the *Places to Grow* Growth Plan for the Greater Golden Horseshoe, and the Greater Toronto and Hamilton Area, which is the planning area for the Metrolinx transportation authority, which has developed a strategic transportation plan for the area, *The Big Move*.

Taking action: Ontario's five-point turn

Two main types of policies can enable cleaner personal transportation. One is to make vehicles and the fuel they use cleaner. The other is to reduce the amount of driving ("vehicle kilometres traveled" or VKT) that takes place on our roads through land-use planning and urban design, better transit options and commuter choice policies that encourage less vehicle use.

To reduce the amount of driving (VKT), the actions that need to happen right now in Ontario begin with government initiatives that are already in place: Metrolinx's *The Big Move* transit plan requires full funding, the *Places to Grow* Growth Plan needs to be strengthened, and the Toronto City Summit Alliance's process should be used to fund transit and reduce congestion.

Another policy already in motion that promotes cleaner vehicles is the province's efforts towards achieving five per cent electric vehicles by 2020. The province is introducing rebates and "green licencing" benefits, which at one time existed for more fuel-efficient vehicles and could be re-applied to include both electric vehicles and very fuel-efficient vehicles.

These five actions take top priority because they are already in some form of development or implementation and either need to be funded, accelerated or strengthened in order to help Ontario make a complete turn toward reduced oil demand from transportation.

Action 1: Fully fund and implement Metrolinx's The Big Move transportation plan

Scope: Greater Toronto and Hamilton Area
Planning Horizon — 2031

Metrolinx is the public authority that manages transportation planning (including transit) within the Greater Toronto and Hamilton Area, where most of Ontario's problem traffic is concentrated. *The Big Move* is Metrolinx's regional transit plan, which accounts for all modes of transportation and outlines over 100 priority actions and policies that support the vision of an integrated transportation system in the future. Its goal is to ease congestion and commute times, and reduce transportation-related emissions of smog precursors and GHGs.[16]

Modelling shows that *The Big Move*, if fully funded and implemented, will effectively decrease VKT and increase transit use.[17] Combined with *Places to Grow*, it is estimated to reduce the total distance travelled in 2031 by personal vehicles in the Toronto-Hamilton region by 19 per cent.

Action Needed — #1

Provide long-term and dedicated provincial funding for implementation of *The Big Move,* sticking to the timeline for investment and construction.

Long-term and full, dedicated funding is needed to implement the transit plan. Currently, the main barrier to fully implementing *The Big Move* is a lack of adequate funding by the provincial and federal governments. Metrolinx and the Toronto City Summit Alliance is conducting a process to determine best mechanisms to achieve this funding.

Action 2: Improve and Implement the Growth Plan for the Greater Golden Horseshoe

Scope: Greater Golden Horseshoe region; Planning Horizon — 2031

Urban planning and design is addressed through the province's *Places to Grow* Growth Plan for the Greater Golden Horseshoe. The Growth Plan is an overarching framework that prescribes where and how growth will occur in the region until 2031. Each municipality must comply with these rules starting in 2015, and their compliance must be reflected in municipal plans. The Growth Plan is a laudable initiative that links with *The Big Move* transit plan and provides a vision for more mixed use, compact communities.

Despite the breadth of the policy, it contains very few numerical targets that can be set, enforced and measured. According to the results of modelling presented in the following table, the Growth Plan, with its current policies and targets, will not be very effective at reducing the number of cars on the road or fuel demand for the region. *The Big Move* and the Growth Plan are intended to work together; however, with both initiatives fully implemented, over 95 per cent of the VKT reductions are attributed to *The Big Move*. Therefore, strengthening the targets in the Growth Plan can more effectively locate new populations close to the transit that will be created under *The Big Move*.

Under the Growth Plan, these outer areas will experience the greatest population growth, so targets need to be improved to reverse this trend. The current targets were set to modestly improve the "laggard" communities, rather than bring them up to the same level as the leaders or to improve the region as a whole. For example, the current intensification of the Growth Plan region sits at 56 per cent,[18] but the Growth Plan's intensification target is 40 per cent, a lower rate than the current average. This target for Ontario and Canada's most populated region is lower than those of similarly populated jurisdictions.[19]

The Growth Plan also sets a density target for the undeveloped "greenfield" areas at 50 people/jobs per hectare, which is only dense enough to support 30-minute wait times (headways) between buses, which is too infrequent to appeal to commuters.[20] Research shows that 60 people/jobs per hectare is the minimum threshold to require reconfiguration of road patterns to accommodate transit, while 80 people/jobs per hectare is the minimum threshold to accommodate 15-minute wait times for transit, the threshold for transit use. Our study proposes a new target of 70 people/jobs per hectare, the level of density increase that can be achieved without changing the characteristics and structure of suburban neighbourhoods preferred by many residents.[21]

Table 2: Current and potential impact of Growth Plan on driving distance in the Greater Golden Horseshoe

The impact of the Growth Plan and *The Big Move* by 2031	Current targets in the Growth Plan	Improved targets in the Growth Plan
Both policies combined – VKT reductions	15.9%	18.2%
Estimated VKT reductions attributed to The Big Move	15.2%	15.2%
Estimated VKT reductions attributed to the Growth Plan	0.7%	3.0%

The above table presents the impact the Growth Plan has on reducing driving distance in the Greater Golden Horseshoe with its current targets, as well as the potential impact of strengthened targets. The table also shows the combined impact of the Growth Plan and *The Big Move,* taking into consideration both current and improved targets.

Currently, the Growth Plan encourages the establishment of intensification areas (areas of high population and employment along transportation corridors and nodes), but has set no targets. The improvements to the Growth Plan should include a target for intensification areas that results in increased access to rapid transit.

A Toronto study found that proximity to rapid transit stations, along with access to frequent transit service, had a positive effect on transit ridership. Meanwhile, as distance to the nearest rapid transit station increased, so too did automobile use.[22] Similar research exists elsewhere including a study in Washington, D.C., that found transit ridership declined by 0.65 per cent for every 100 feet of distance from a transit stop.[23]

The final improvement to the Growth Plan is to slightly expand and increase the "Urban Growth Centres." By increasing urban growth centres, these areas can further encourage transit use and active transportation.

Action Needed — #2

Improve and enforce strengthened Growth Plan targets

Table 3 (below) presents proposed improvements to Growth Plan targets and a summary rationale. Note that these improvements are conservative and represent what is achievable and palatable — for example, people can still choose to live in detached suburban houses. Thus, there remains room for further improvements.

Table 3: Proposed improvements to Growth Plan targets

Intensification	**The percentage of future growth allocated to built-up areas" – the rest occurs in the undeveloped greenfield areas**
Current Target	40% of new growth in the built-up areas; 60% in greenfield areas
Improved Target	60% of new growth in the built-up areas; 40% in greenfield areas
Rationale	Research links higher intensification to lower VKT Higher intensification rates are occurring in other jurisdictions Many Greater Golden Horseshoe communities have higher intensification targets
Greenfield Density	**Number of jobs and people per hectare**
Current Target	50 jobs/people per hectare
Improved Target	70 jobs/people per hectare
Rationale	78-80 jobs/people per hectare can support 15-minute wait times for transit[24] 70 jobs/people per hectare can be achieved without changing the characteristics and structure of suburban neighbourhoods Compactness is the most important factor for reducing automobile dependence[25]
Intensification Areas	**Concentration of population along major transit corridors and transit nodes, increasing access to rapid transit**
Current Target	No target exists
Improved Target	All additional population in built-up areas resulting from increased intensification to be located along transit corridors and nodes.
Rationale	Access to rapid transit linked to transit use VKT decreases as population is located closer to the city core, but the same is true for employment centres (intensification areas at transit nodes)
Urban Growth Centres	**Focal areas for development in the Greater Golden Horseshoe — will be transit nodes and serve as high-density employment and residential centres.**
Current Target	Depending on location, between 150 and 400 jobs/people per hectare
Improved Target	Increase the density of each individual growth centre by 20%
Rationale	Urban growth centres are the densest areas in the GGH. Trips in these areas are more easily made by walking, biking or riding transit.

Some communities are not complying with the Growth Plan's current targets and are expanding development beyond current settlement boundaries, which will result in even greater dependence on automobile travel. Therefore, targets not only require improvement, but the province requires greater authority to enforce them. With the Provincial Policy Statement currently under review, there is an opportunity to revise the rules of the game and place more authority with the Growth Secretariat to properly enforce the Growth Plan and require municipalities to conform.

Action 3: Adopt a package of "commuter choice" policies to reduce traffic congestion in the Greater Toronto and Hamilton Area

Scope: Greater Toronto and Hamilton Area

The Toronto City Summit Alliance and Metrolinx are exploring a range of "road-pricing" and "fuel-pricing" policies to fund Metrolinx and reduce traffic congestion in the Greater Toronto and Hamilton Area. An effective pricing policy both discourages auto use, reducing VKT, and directs revenue to transit and other clean transportation infrastructure and operations. Pricing policies under consideration include a regional gas tax, tolls, commercial parking levies and congestion charges.

These policies can be balanced with incentives to encourage switching to practical, affordable alternatives. These incentive-based options include employer-based programs for carpooling, transit and active transportation, pay-as-you drive insurance, live-where-you-work mortgage benefits, and incentives to take transit, cycle or walk.

Commuter choice policies in action:

Parking caps in downtown Portland helped increase transit use in the city from about 20% in the 1970s to nearly 50% by the mid-1990s.[26]

A study concluded that a **congestion charge** in Californian cities would decrease GHG emissions by roughly 4-8%.[27]

A 2010 Harvard study shows that **taxing gasoline** results in the highest reductions in oil demand relative to other transportation policies.[28]

Research found **pay-as-you-drive insurance** to be one of the most effective methods of decreasing VKT and promoting mode shift.[29]

A single **"parking cash-out"** law in California that offers a cash allowance in lieu of subsidized parking spaces has reduced car trips by 11%.[30]

The average motorist makes 2,000 trips each year that are less than 3 km. **Bicycle programs** have been demonstrated to reduce the VKT associated with trips less than 15 minutes by up to 5%.[31]

These commuter choice options are relatively quick to deploy and can generate reductions in VKT to create immediate benefits. These options can also help ease the transition to policy outcomes that require longer lead times, such as building new transit infrastructure, more compact urban form, or the effective shift to a more fuel-efficient vehicle fleet.

Table 4 lists a number of potential commuter choice options and the estimated

impact on reducing auto trips on VKT. Based on these examples, it is estimated that adopting and implementing comprehensive package of select road-pricing, fuel-pricing and incentive-based policies could collectively reduce VKT in the Greater Toronto and Hamilton Area by a minimum of 15 per cent.

Action Needed — #3

Adopt and implement a package of commuter choice policies to reduce VKT and help transition to a cleaner transportation system.

Table 4: Potential impacts of various commuter choice policies

Commuter Choice Incentives	Potential Impact
Pay-as-you-drive (PAYD) insurance: PAYD insurance assigns a clear price to VKT, charging per kilometre. the province can implement legislation and benefits to reward participating companies, such as tax credits that can be phased out once a specific number of vehicles covered by PAYD insurance is reached.	A 10% reduction in VKT associated with a charge of $0.06 per KM.[32]
Employer-based incentives: Combination of incentive and disincentive programs, including parking supply restrictions, refunding non-drivers for the savings of not having to provide parking, carpooling services, end-of-trip-facilities (bike racks and showers), and providing incentives for using other forms of transport, like transit passes.	Reduce work-related VKT 5-25%[33]
Live-where-you-work mortgages: Location-efficient mortgages that provide discounted mortgages to people who chose to buy a home in compact and mixed-use communities serviced by public transportation.	Reduce household VKT 15—50%[34]
Active Transportation: With incentives, bicycle programs, and safer cycling and walking infrastructure, these trips would be substantially reduced.	Up to 5%[35]
Metrolinx Policies: Work at home, active transportation, and transit incentives (i.e. integrated fare system and employer provided transit passes).	Reduce VKT by 1-3%[36]
High-occupancy vehicle (HOV) lanes: Including other car pool related policies (such as preferential parking). Metrolinx estimates that occupancy can increase from 1.15 to 1.32.	Reduce VKT by up to 8-15% [37]
Pricing Policies	
Regional gas tax	A 10% increase in fuel price can result in a 3-6% decrease in VKT.[38]
Site-specific tolls: Tolls on 400-series highways and municipal controlled-access highways in the Greater Toronto and Hamilton Area.	Reduce VKT 1—3%[39]
High Occupancy Tolls: Tolls or charges on only some lanes of a multiple-lane highway, leaving other lanes toll-free. Can encourage car pooling and provide toll-free alternatives for users of the partly tolled highway.	Can increase impact of HOV lanes. Toll lanes would reduce congestion and provide an early source of funding for Metrolinx
Commercial Parking Fees	Reduce VKT up to 7%. In general, a 1% increase in parking prices leads to a 0.07% decrease in vehicles.[40]

Some pricing policies can be applied first to a test area/highway and then expanded more broadly. Revenue generated (assuming the options are applied within the Greater Toronto and Hamilton Area) could be used to fund the implementation of Metrolinx, as well as transit operations and maintenance. Site-specific policies such as tolls should begin on a highway where there is currently a viable alternative (ie: Hwy 404/ Yonge/ Sheppard Subways, Hwy 401 where GO Trains exit), and incentive options could be introduced and transit service improved along pilot routes. In other cases where there are no transit alternatives, funding for highway expansion should be halted and redirected to build a transit line. Once transit capacity is increased, a toll is justified and can bring in funds for transit operations.

Broader funding strategies that do not necessarily reduce VKT also need to be considered but are not included in this VKT-specific policy, such as vehicle registration fees, earmarking of HST gas revenues, and a provincial-federal funding strategy. Please refer to the detailed study on transit funding by the Toronto City Summit Alliance.[41]

Action 4: Achieve five per cent electric vehicles by 2020

Scope: Province-wide

In 2009, the Government of Ontario announced a plan for one in 20 vehicles to be electrically powered by 2020. Ontario has launched a number of initiatives to encourage consumers to adopt electric vehicle technologies as they become available, including the purchase incentives launched in 2009. It is also developing a green licensing program for electric vehicles, which includes incentives such as access to parking spots and carpooling or HOV lanes. The Government of Ontario is also working to develop infrastructure through means including the partnership launched in January 2009 to bring the Canadian office of Better Place (a company specializing in electric vehicle systems planning) to Toronto, and by working with a coalition of partners to develop a charging system.

Modelling shows that if one in 20 vehicles in Ontario are fully electric[42] by 2020, 3.8 million barrels of oil can be saved per year, along with more than $300,000,000 in expenditures to import oil (based on current prices). That amount could be kept in the province, and the money saved could be invested in a local economy that supports the manufacture and use of electric vehicles. Electric vehicles are an emerging technology and supporting them would support innovation in Ontario's manufacturing sector to design, construct and supply electric vehicles and services. In addition, this study assumes the Green Energy Act prioritizes and expands green energy and can accommodate the necessary growth in renewable energy sources to support growth in electric vehicle use.

Action Needed — #4

The Ontario government should adopt the 5% 2020 target as official policy, and require a comprehensive strategy to link the initiatives started in 2009 with other actions to fully achieve the target. (The 5% target is currently considered an ambition rather than an official policy.)

Some additional programs that could support this five per cent target include:

- Avoiding delays in allocating permits for charging stations and other infrastructure needed to support electric

vehicles, and ensuring building codes support the operation of plug-ins;

- Moving forward with green licensing incentive programs for electric vehicles;
- Strengthening the Green Energy Act to boost green energy supply to meet anticipated increase in demand from electric vehicles based on the above greener targets; and
- Ensuring legislation provides the necessary regulatory process to remove barriers (such as bylaws) to electric vehicle infrastructure.

Action 5: Encourage the purchase and manufacture or more fuel-efficient vehicles

Switching to more fuel-efficient vehicles has the potential to significantly reduce fuel consumption per kilometre traveled, as well as reducing oil demand and GHG emissions.[43] Leading jurisdictions are combining regulations with incentive-based programs, such as "feebates",[44] to achieve measurable reductions in oil demand and GHG emissions.[45]

Recent modelling by the Pembina Institute shows that the proposed Canadian federal standard for vehicle GHG emissions, which regulates vehicle fuel efficiency, is not likely to have a measurable impact before 2016. In this context, the Ontario government can put policies in place to encourage consumers to purchase more fuel-efficient vehicles, thereby improving results in the immediate term. Such policies would also work together with potentially stronger federal standards after 2016, providing incentives for consumers and manufacturers to exceed the standards in Ontario.

Proposed federal regulations for vehicle GHG emissions — 2011 to 2016

The federal government recently introduced regulations to reduce GHG emissions by improving the efficiency of cars and light trucks. However, analysis by the Pembina Institute shows that the proposed regulations may not lead to changes in the fuel efficiency of new vehicles that are purchased between 2011 and 2016. Assuming manufacturers continue the historical trend of making new vehicles more fuel efficient with or without regulations, Pembina's analysis shows that the proposed targets may be no better than business as usual before 2015 at the earliest — and for light trucks, possibly not before 2016 (the end date of the regulations).

The draft Canadian regulations also provide "early action credits" that could allow manufacturers to delay improvements in vehicle efficiency. The relatively weak level of the standards, plus the early action credit loophole in the regulations, may allow automakers to avoid improving fuel economy through 2016.

Possible expansion and improvement in federal regulations — 2017 and beyond

It is possible that, if Canada extends the regulations beyond 2016, vehicle fuel economy actually will improve compared to business as usual and oil demand will be reduced. The United States is reviewing the options for extending its federal vehicle fuel economy standards beyond 2016, and Canada has stated its intention to harmonize with the U.S. standards.[46] As presented in Table 1 at the beginning of this report, if Canada sets fuel economy standards each year from 2017 through 2031 and limits the use of early action credits (or any other loopholes), the standards could offer a

significant opportunity for reducing oil demand in Ontario. These results reflect an "actual" fuel economy (net of credits) that improves by 2.5 per cent per year from 2017 to 2022, then from 3.5 per cent per year from 2023 to 2031. The expanded federal fuel standards are not listed in the table as an "Ontario action," but are included in the combined impact of policies (see Table 1).

Ontario Action: Incentives for purchase and use of more fuel-efficient vehicles

In the absence of a strong federal regulation for vehicle efficiency through 2016, the Ontario government can introduce incentives that actually encourage consumers to buy more fuel-efficient vehicles and reward manufacturers who produce them. In particular, these incentives would be most beneficial in the immediate term to compensate for the delayed impact of the proposed federal regulations. Research shows that regulations combined with performance-based incentives have the greatest impact on reducing oil demand.[47]

Ontario has several options for providing incentives for more fuel-efficient vehicles. In the immediate term, Ontario's "green licensing program," which currently rewards the purchase of electric vehicles, could be expanded to include highly fuel-efficient vehicles as well. In fact the green licensing program was originally established in 2007 for fuel-efficient vehicles, but it was cancelled before it was implemented. The current green licensing program includes benefits such as parking privileges and access to high-occupancy lanes for drivers of electric vehicles.

Feebates, tax-credits and other incentives can motivate manufacturers to design more efficient vehicles when regulations fall short.

The province could also support the development of improvements in vehicle technologies through performance-based tax credits, including rebates or feebates, to promote greater fuel efficiency through price signals. Feebates can be used to reward consumers who purchase and incent manufacturers who produce vehicles that are more fuel efficient than the average vehicle in a specific class, while penalizing buyers of less fuel-efficient vehicles — resulting in a revenue-neutral mechanism, whereby the funds collected through fees (surcharges) is equal to the amount paid out in rebates.

Ontario's *Tax for Fuel Conservation* is a feebate system that has been in place since 1992. However, the design of this program has severely limited its effectiveness; almost all vehicles face the same charge under the current policy. [48] Fortunately, this program provides an opportunity to revise the existing policy, rather than having to start implementation from scratch. Ontario can increase the rewards and penalties of the *Tax for Fuel Conservation,* leading to an effective policy that shows leadership in North America.

Feebates, tax-credits and other incentives can motivate manufacturers (where regulations with loopholes don't) to make changes to improve the fuel efficiency of their models. Manufacturers tend to be more price-sensitive (profit-maximizing) than consumers, and will be encouraged to design more efficient vehicles. Manufacturers benefit when buyers are rewarded for the more efficient models. Incentives can also be designed to provide part of the financial reward directly to the manufacturer.[49]

Ontario will need to develop a clear strategy for encouraging more fuel-efficient vehicles through incentives. Just like the five per cent target for electric vehicles by 2020[50], Ontario can also set a goal for fuel-efficient vehicles, a target for the number of efficient vehicles sold by a particular date (such as 2020). Well-designed incentive policies will motivate consumers and manufacturers through 2016, during which time the federal fuel economy standards are expected to have limited or no improvements. These polices can be adjusted in the future if stronger fuel economy standards are introduced, so that the policies continue to motivate improvements in fuel economy beyond the levels of the standards.

For the purpose of estimating reduction in fuel demand from this action, this report measures the results of improvements on the proposed federal fuel economy standards that could result from a well-designed incentive program. A feebate program introduced in France in 2008 resulted in a three per cent improvement in fuel economy of new vehicles, relative to change in the rest of the European Union. The results in Table 1 are based on improving fuel economy by 2.5 per cent relative to expected fuel economy for new vehicles purchased in 2011 to 2016. After 2017, the impact of the incentives is decreased slightly to account for the expected strengthening of the federal standards.

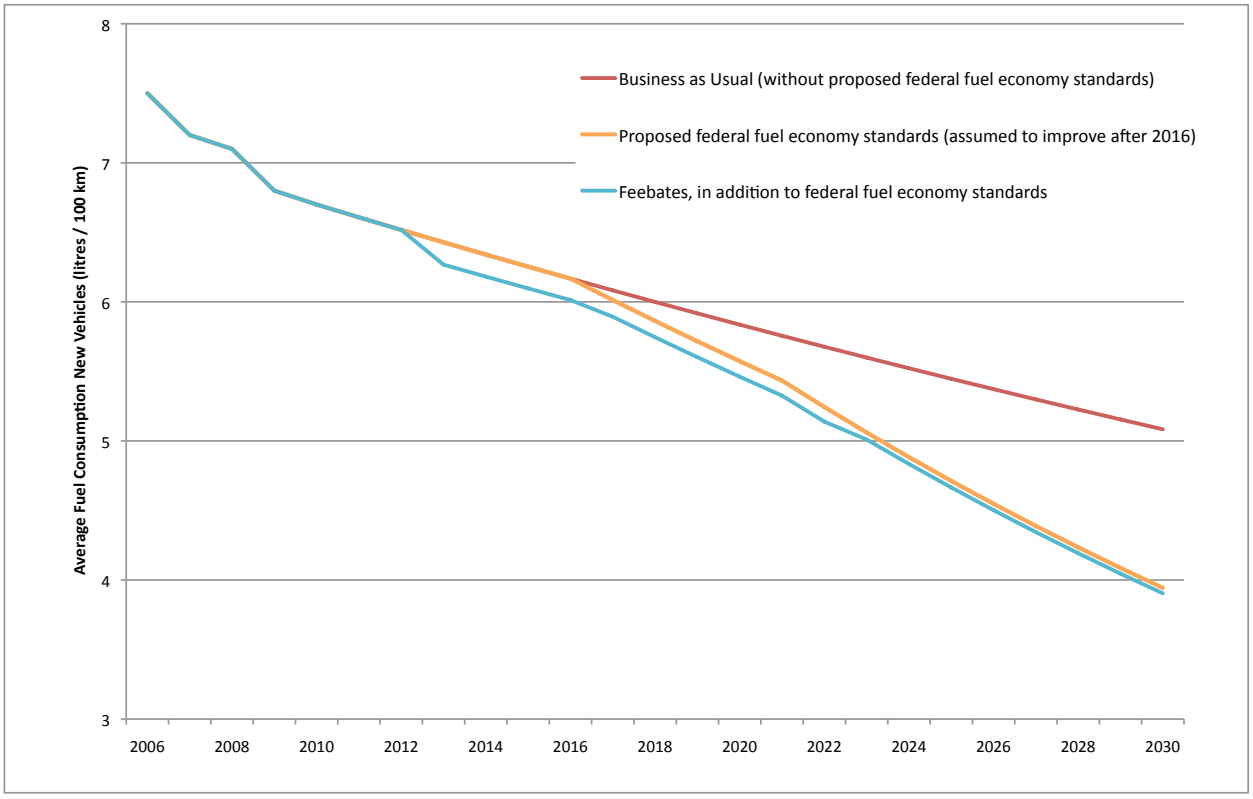
Figure 3 (below) shows the expected fuel consumption across all new vehicles (average fleet fuel efficiency) purchased in each year from 2010 through 2030. It illustrates that, through 2016, the proposed federal fuel economy standards appear to make little improvement beyond the business as usual scenario. In 2017 and beyond, the standards can lead to improvements relative to business as usual, assuming the standards are expanded beyond 2016 and loopholes are minimized. Incentives provided by Ontario could lead to further improvements each year in new vehicle fuel economy. Improved fuel economy of new vehicles leads to savings in oil demand for each year of the vehicle's life. Oil demand reductions are presented in Table 1.

Action Needed — #5

Set a target for a percentage of vehicles sold in Ontario to have an optimal level of fuel efficiency by 2015, 2020 and beyond.

Achieve these targets by encouraging alternative vehicle technologies — both electric vehicles and highly fuel-efficient vehicles — through incentive-based programs such as improving the tax for fuel conservation to an effective feebate policy, and expanding Ontario's green licensing program to include very fuel-efficient vehicles.

Figure 3: Average fleet fuel consumption for new cars in Ontario under three scenarios



Endnotes

[1] "Obama lashes out at BP in Oval Office address," *Globe and Mail*, June 15, 2010. http://www.theglobeandmail.com/news/world/obama-condemns-bp-champions-green-energy/article1605632/?cmpid=rss1

[2] Dan Woynillowicz, Chris Severson-Baker, Marlo Raynolds, *Oil Sands Fever: The Environmental Implications of Canada's Oil Sands Rush* (The Pembina Institute, 2005), 12. pubs.pembina.org/reports/OilSands72.pdf

[3] Energy Resources Conservation Board (ERCB). 2010. "ERCB Approves Fort Hills and Syncrude Tailings Pond Plans with Conditions." http://www.ercb.ca/docs/new/newsrel/2010/nr2010-05.pdf

[4] Based on an oil price of $78.48/barrel. Oil-Price.Net, Crude Oil and Commodity Prices: August, Wednesday 11 2010 - 11:14:52. http://www.oil-price.net/

[5] Statistics Canada. The Supply and Disposition of Refined Petroleum products in Canada. February 2010. http://www.statcan.gc.ca/pub/45-004-x/2010002/t115-eng.htm.

[6] Based on an oil price of $78.48/barrel. Oil-Price.Net, August, Wednesday 11 2010 - 11:14:52.

[7] Metrolinx, *The Big Move* (Greater Toronto Transportation Authority, 2008). www.metrolinx.com/Docs/big_move/TheBigMove_020109.pdf

[8] 80% of refined pretroleum products sold in Ontario are for transportation (motor gasoline, diesel, and aviation fuels). Statistics Canada, "The Supply and Disposition of Refined Petroleum products in Canada," February 2010. http://www.statcan.gc.ca/pub/45-004-x/2010002/t115-eng.htm.

[9] Environment Canada, National Inventory Report: Greenhouse Gas Sources and Sinks in Canada 1990– 2007 (2009), 555.

[10] Ibid.

[11] Based on energy use data from NRCan: Office of Energy Efficiency, "Comprehensive Energy Use Database, 1990 to 2007: Transportation Sector, Ontario, Table 7: Secondary Energy Use by Transportation Mode." http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablestrends2/tran_on_7_e_4.cfm?attr=0

Conversion assumes all transportation fuel is gasoline (34.66 GJ/m^3) and that that one barrel of gasoline requires 1.08 barrels of oil based on refinery yields.

[12] The OECD report *OECD Territorial Reviews: Toronto, Canada*, is available to order through www.oecd.org/document/1/0,3343,en_2649_34413_43985281_1_1_1_1,00.html.

[13] Ontario Ministry of Finance, "Ontario Population Projections Update" (2010). http://www.fin.gov.on.ca/en/economy/demographics/projections/

Vehicle Ownership based on: NRCan Office of Energy Efficiency, "Canadian Vehicle Survey 2007 Summary Report." http://oee.nrcan.gc.ca/Publications/statistics/cvs07/chapter2.cfm?attr=0

[14] Ibid.

[15] Source: Upper image – Google Maps. Lower image – Metrolinx. http://www.metrolinx.com/thebigmove/introduction/1_2_GTHA.html

[16] Ibid.

[17] Cherise Burda, Alison Bailie and Graham Haines, *Driving Down Carbon: Reducing GHG Emissions from the Personal Transportation Sector in Ontario* (The Pembina Institute: 2010).

[18] Zack Taylor and Marcy Burchfield with Byron Moldofsky and Jo Ashley, *Growing Cities: Comparing urban growth patterns and regional growth policies in Calgary, Toronto, and Vancouver* (Neptis Foundation, 2010). http://www.neptis.org/library/cf_download.cfm?file=Growing_Cities_Report_FinalWeb_secure.pdf&path=\

[19] Examples include 80% for Vancouver (from Taylor and Burchfield, *Growing Cities*); 60 to 70% intensification target for the United Kingdom and New South Wales. San Francisco intends to accommodate 56% of the Bay Area's

employment and population growth in just 3% of the region's land area (Metropolitan Transportation Commission, *Transportation 2035 Plan for the San Francisco Bay Area* (2009).)

[20] IBI Group, *Central Okanagan Smart Transit Plan: Transit-Supportive Guidelines*, 2008, 33.

IBI Group, *Transit Supportive Land Use Planning Guidelines*, prepared for Ontario Ministry of Transportation and Ministry of Municipal Affairs (1992), 18. www.mah.gov.on.ca/AssetFactory.aspx?did=1179.

[21] Waterloo Region Planning Department, *Visualizing Densities: Future Possibilities*, 53–75.

[22] IBI Group, *Greenhouse Gas Emissions from Urban Travel.*

[23] JHK and Associates, *Development-Related Ridership Survey II*, prepared for the Washington Metropolitan Area Transit Authority (1989).

[24] IBI Group, *Central Okanagan Smart Transit Plan.*

[25] Parsons Brinckerhoff Quade & Douglas, Inc., *TCRP Report 16: Transit and Urban Form*, prepared for Transportation Research Board, National Research Council, Washington, D.C. (1996), vol. 1, part I.

[26] Victoria Transportation Institute, www.vtpi.org/tdm/tdm79.htm.

[27] Greig Harvey and Elizabeth Deakin, "The STEP Analysis Package: Description and Application Examples," Appendix B, in U.S. Environmental Protection Agency, *Guidance on the Use of Market Mechanisms to Reduce Transportation Emissions* (1997).

[28] W. Ross Morrow, Kelly Sims Gallagher, Gustavo Collantes and Henry Lee, *Analysis of Policies to Reduce Oil Consumption and Greenhouse-Gas Emissions from the U.S. Transportation Sector*, Belfer Center for Science and International Affairs (Harvard University, 2010).

[29] Steve Winkelman, "Travel Demand and Urban Form: Lessons and Visions," presented at the Asilomar Conference on Transportation and Climate Policy, August 22, 2007, www.its.ucdavis.edu/events/outreachevents/asilomar2007/presentations/Day%201%20Session%203/Winkelman%20Intro%20to%20Asilomar%20Demand%20Session%20(8.22.07).pdf.

Pay as you drive insurance has shown to effectively decrease auto use. At the average rate of $0.06 per mile a decrease of 9.7% is estimated. (Harvey and Deakin, "The STEP Analysis Package," cited and updated in Victoria Transportation Institute, "Pay-As- You-Drive Insurance," Online TDM Encyclopedia, October 31, 2009, www.vtpi.org/tdm/tdm79.htm).

[30] Transport Canada, "Parking cash-out, development permit approval process," www.tc.gc.ca/eng/programs/environment-utsp-tdm-prj73e-1020.htm.

[31] G. Dierkers, E. Silsbe, S. Stott, S. Winkelman and M. Wubben, *CCAP Transportation Emissions Guidebook Part One: land use, transit and travel demand management* (Washington, 2005).

[32] Safirova, E., Houde, S., & Harringtong, W. Spatial Development and Energy Consumption. (Washington, 2007). http://www.rff.org/RFF/Documents/RFF-DP-07-51.pdf.

[33] G. Dierkers et al, *CCAP Transportation Emissions Guidebook Part One*.

[34] Ibid.

[35] Ibid.

[36] Based on modeling impact of output adjustments from Metrolinx. See Metrolinx (2008), Backgrounder: Modelling.

[37] Based on increasing average auto occupancy from 1.15 or 1.22 to 1.32 people per car.

[38] T. Litman, *Carbon Taxes: Tax what you burn, not what you earn* (Victoria, 2010). http://www.vtpi.org/carbontax.pdf.

[39] G. Dierkers et al, *CCAP Transportation Emissions Guidebook Part One*. Based on tolls of $0.08-0.19 per mile.

[40] Rodier, C. (2009). Review of International Modeling Literature: Transit, Land Use, and Auto Pricing Strategies to Reduce Vehicle Miles Traveled and Greenhouse Gas Emissions, 12. And Getting to Carbon Neutral

[41] Toronto City Summit Alliance, Transportation and Other Infrastructure Working Group Discussion Paper. Time to Get Serious: Reliable Funding for the GTHA Transit/ Transportation Infrastructure. Prepared by Neal Irwin, IBI Group and Andrew Becan, Sustainable Prosperity, July 1, 2010.

[42] For the purpose of this study, the modelling assumes that new EV technology is fully electric; however Pembina's forthcoming detailed analysis will incorporate semi-electric fuel economy impacts; the overall oil savings from this policy may be reduced. There is debate over fuel economy of PLEVs: http://usnews.rankingsandreviews.com/cars-trucks/daily-news/080908-Chevy-Volt-100-mpg-or-48-mpg-/

[43] Burda et al, *Driving Down Carbon.*

[44] "Feebates" can be used to reward consumers who purchase and incent manufacturers who produce vehicles that are more fuel efficient than the average vehicle in a specific class, while penalizing buyers of less fuel-efficient vehicles — resulting in a revenue-neutral mechanism, whereby the funds collected through fees (surcharges) is equal to the amount paid out in rebates.

[45] John German and Dan Mezler, *Best Practices for Feebate Program Design and Implementation* (The International Council on Clean Transportation, 2010.) http://www.theicct.org/documents/0000/1471/feebate_icct.pdf

[46] The White House, Office of the Press Secretary, *Presidential Memorandum Regarding Fuel Efficiency Standards* May 21, 2010. http://www.whitehouse.gov/the-press-office/presidential-memorandum-regarding-fuel-efficiency-standards

[47] W. Ross Morrow et al, *Analysis of Policies to Reduce Oil Consumption;* German and Mezler, *Best Practices for Feebate Program Design.*

[48] German and Mezler, *Best Practices for Feebate Program Design.*

[49] Ibid.

[50] As noted in the earlier section, this is not an official target but rather a "challenge" to manufacturers in Ontario.