

Hon. George Heyman, Minister of Environment and Climate Change Strategy
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22 August 2018

Re: Clean Transportation Intentions Paper

Dear Minister Heyman,

I am writing in regard to the recently published, [Clean Transportation Intentions Paper](#), which describes ways the BC Government plans to reduce transportation emissions. Although the paper mentions some “clean transportation systems” strategies, such as car-pooling, vehicle co-ops, more public transit, and better integration between transit and cycling, these are limited and outdated.

The general term for these strategies is *Transportation Demand Management* (TDM), which includes numerous of policies and programs that encourage travellers to use more efficient travel options in order to reduce traffic problems including congestion, accidents and pollution, and to achieve social equity goals. Instead of *car-pooling*, most experts now use the broader term, *ridesharing*, which also includes van-pooling, and although some communities still have vehicle co-ops, these have been mostly displaced by commercial car-sharing services such as Modo, Car2Go and Zipcar. I suggest that the paper be expanded and updated to include a much larger set of TDM strategies and use more current terminology.

I particularly recommend adding *Pay-As-You-Drive* (PAYD, also known as *distance-based* and *usage-based*) vehicle insurance as a potential emission reduction strategy. PAYD bases premiums directly on the amount a vehicle is driven during the policy term, which gives motorists a new opportunity to save money, which increases affordability, and a significant new incentive to reduce mileage and therefore traffic impacts. An abundance of research indicates that PAYD pricing tends to increase fairness, affordability, safety and efficiency. It tends to provide particularly large savings and benefits to lower-income and rural drivers.

Because of its many benefits, recent studies rank PAYD pricing as one of the most cost-effective transportation emission reduction strategies available. It is especially appropriate in BC, since ICBC’s monopoly on basic vehicle insurance coverage is justified on the grounds that it will provide extra social benefits. By applying PAYD pricing, ICBC can provide large emission reductions, as well as affordability and safety benefits.

Attached is our *Pay-As-You-Drive Insurance in British Columbia* backgrounder which provides additional information about this important strategy.

Best wishes,



Todd Litman

Pay-As-You-Drive Insurance in British Columbia

Backgrounder

22 August 2018

Pay-As-You-Drive Insurance is the best transportation policy reform you've probably never heard of.

What is PAYD Vehicle Insurance?

Pay-As-You-Drive (PAYD, also known as distance-based, usage-based and per-mile) insurance means that premiums are based directly on the amount a vehicle is driven during the policy term, so the more you drive the more you pay and the less you drive the more you save. It changes the unit of exposure (how premiums are calculated) from the *vehicle-year* to the *vehicle-kilometer*. Existing rating factors are incorporated so higher-risk motorists pay more per kilometer than lower-risk drivers. For example, a \$400 annual premium becomes 2¢ per kilometer, and a \$2,000 annual premium becomes 10¢ per kilometer. An average motorist would pay about 6¢ per kilometer.

PAYD pricing gives motorists a significant new incentive to reduce mileage, but it is not a new fee, simply a different way of paying an existing fee. Motorists who drive average annual mileage pay the same as they do now, but those who drive less save money, reflecting the claim cost savings provided by lower mileage and therefore crashes. Experience with vehicle price changes indicates that PAYD pricing would reduce affected vehicles' annual mileage by 10-15%, consisting of lower-value vehicle travel that motorists willingly forego in order to reduce their premiums. It tends to provide particularly large savings and benefits to lower-income and rural motorists.

PAYD insurance has been widely studied as a way to increase fairness, affordability, safety and efficiency (Bordoff and Noel 2008; Edlin 2003; Greenberg 2013). It redefines insurance *affordability*: with current pricing affordability requires overcharging lower-risk drivers relative to their actual claim costs in order to reduce premiums for higher-risk drivers. With PAYD, affordability means that higher-risk motorists limit their mileage to what they can afford, which increases safety for all road users.

Benefits

- **Consumer savings and affordability.** A typical motorist who reduces annual mileage 10-15% will save \$100-150 annually, representing the claim cost savings from reduced exposure. Since lower-income motorists tend to drive their vehicles less than average, they tend to save the most, and most rural motorists would save money and have lower crash risks (Bordoff and Noel 2008).
- **Increased fairness.** Current insurance pricing overcharges motorists who drive less than average and undercharge those who drive more than average in each rate category. PAYD corrects this.
- **Reduced pollution emissions.** The predicted 10-15% travel reduction should provide comparable energy savings and emission reductions. PAYD is considered one of the most cost-effective climate change emission reduction strategy available (Cambridge Systematics 2009; Greenberg and Evans 2017).
- **Traffic safety.** Because higher-risk drivers have the greatest incentive to reduce their driving, vehicle crashes should decline more than mileage, providing large reductions in crash casualties and insurance claim costs (Ferreira and Minikel 2012; Kendall 2016).
- **Reduced traffic problems.** Everybody can benefit from reduced traffic congestion and roadway costs.

Actuarial Justification and Safety Impacts

Several types of evidence indicate that PAYD pricing can reduce vehicle travel and crash costs. This includes general research on the relationships between per capita vehicle travel and traffic casualty rates, as illustrated in Figure 1, and claims data on individual vehicles, as illustrated in Figure 2.

Figure 1 Vehicle Mileage Versus Traffic Fatalities in U.S. States (FHWA 1993-2002 data)

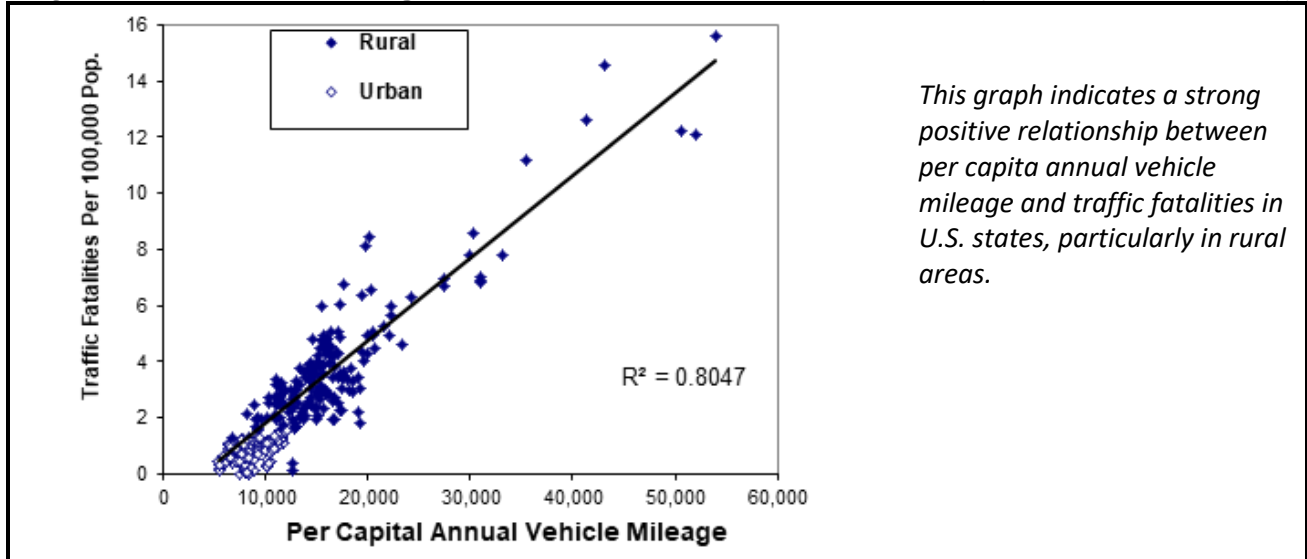
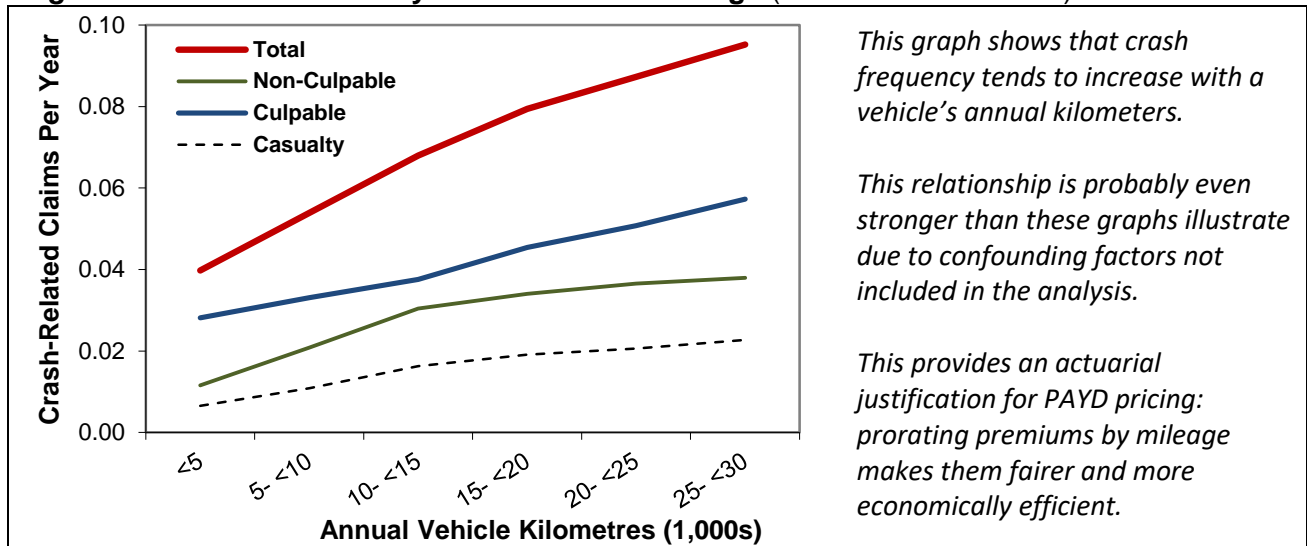


Figure 2 Crash Rates by Annual Vehicle Mileage (British Columbia Data)



A major study that matched annual mileage and insurance claim cost data for 2.8 million vehicle-years found that, all else being equal, as mileage increases so do vehicles' chances of having crashes and insurance claims (Ferreira and Minike 2012). Since mileage is just one of several important risk factors, it would not be actuarially accurate to charge all motorists the same per-kilometer premium, but premiums more accurately reflect claim costs if annual vehicle travel is incorporated with other rating factors.

About two-thirds of casualty crashes involve multiple vehicles, so reductions in total vehicle travel can provide proportionately larger crash reductions (Edlin and Mandic 2006). In other words, each road user is safer if other motorists reduce their vehicle travel since this reduces their exposure to other drivers' errors. Edlin (1998) found the elasticity of claim costs with respect to mileage is between 1.42 and 1.85, meaning a 10% reduction in vehicle mileage reduces total crashes 14-18%.

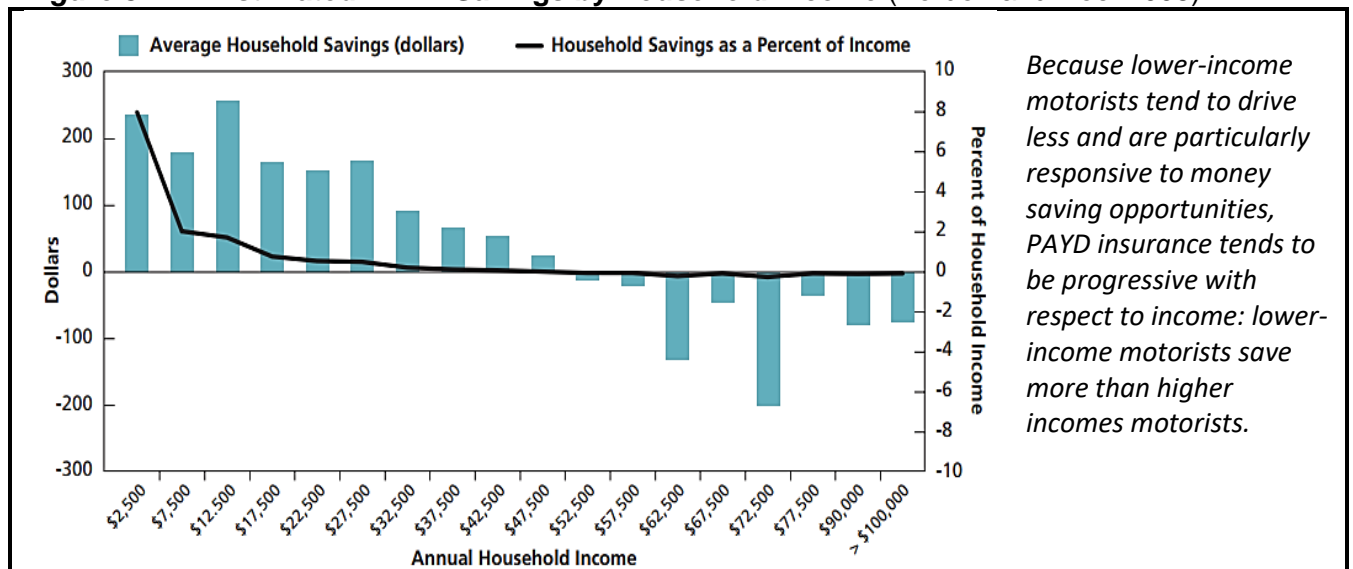
Good research indicates that prices affect vehicle travel and crash rates. Using international data, Ahangari, et al. (2014), and Burke and Nishitatenno (2015), found that a 10% gasoline price increase reduces traffic fatalities 2-6%. Using U.S. data, Sivak (2008) and Grabowski and Morrisey (2004) estimate that each 10% fuel price increase reduces total traffic deaths 2.3% or more, with larger reductions by younger drivers, apparently because they are particularly price-sensitive. In subsequent research, Grabowski and Morrisey (2006) estimate that each one-cent state gasoline taxes increase reduces per capita traffic fatalities 0.25%. Leigh and Geraghty (2008) estimate that a sustained 20% gasoline price increase would reduce approximately 2,000 U.S. traffic crash deaths (about 5% of the total), plus about 600 air pollution deaths.

Studies by Chi, et al. (2010, 2011 and 2013) quantify fuel price impacts on traffic crashes in various U.S. regions. Fuel price increases reduce both total traffic crashes and distance-based crash rates, with impacts that vary by geographic and demographic factors, and increase over time. All these studies show that fuel price increases reduce per-mile crash rate, so a 1% reduction in total VMT provides more than a 1% reduction in total crashes. In Minnesota they estimate that a \$1.00 per gallon gasoline price increase would reduce total rural crashes 28.2%, total urban crashes 18.4%, and urban fatal crashes 18.4%. They find that fuel price increases cause larger short-term crash reductions by younger drivers, and larger intermediate-term reductions by older and male drivers (2010a; 2011), and large drunk driving crash reductions (2010b).

Impacts on Lower-Income and Rural Motorists

Since lower-income motorists tend to drive their vehicles less than average and are particularly responsive to savings opportunities, PAYD tends to be progressive with respect to income. One major study found that PAYD provides savings to 64% of all households and almost 80% of low-income households, averaging \$496 annually per household that saves (Figure 3). More than half of all rural residents would save money, and because they have high traffic casualty rates they enjoy particularly large safety benefits.

Figure 3 Estimated PAYD Savings by Household Income (Bordoff and Noel 2008)



How Does PAYD Affect Consumers?

Most motorists have some marginal-value vehicle travel that they will forego if given a new opportunity to save money. PAYD insurance gives motorists a significant new incentive to reduce their lower-value mileage, but it is not a new fee, just a different way to pay an existing fee. The vehicle travel foregone consists of vehicle-kilometers that motorists value less than the savings. For example, if a motorist who currently pays \$1,400 annual premiums instead pays 7¢ per kilometer, and as a result drives 2,000 fewer annual kilometers, the reduced vehicle travel consists of kilometers they value less than 7¢, and their \$140 savings represent consumer surplus gain; money they value more than the vehicle-kilometers foregone.

Implementing PAYD in BC

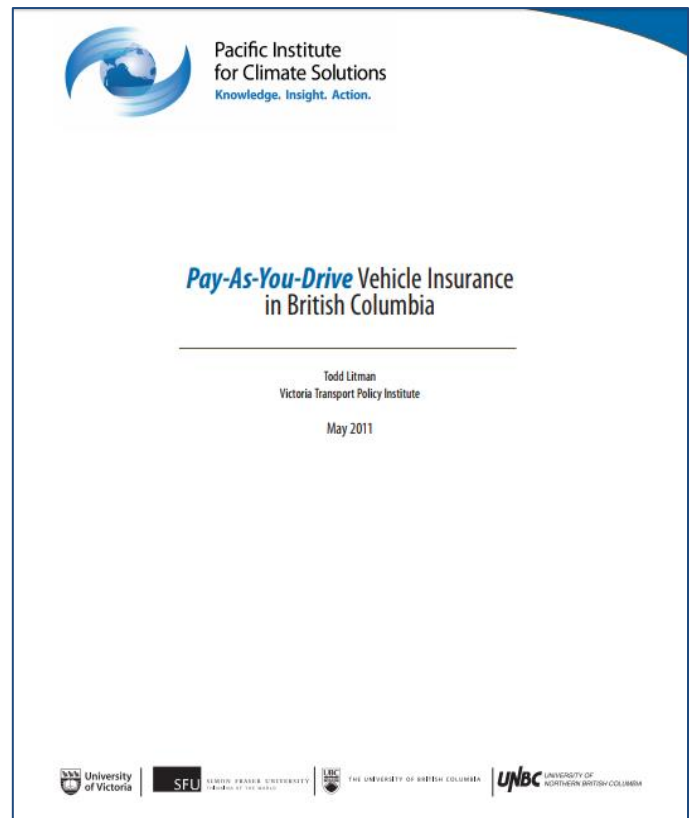
PAYD pricing can help achieve provincial policy goals including consumer savings and affordability (savings for lower-income households), road safety, reduced congestion and pollution emissions reductions. It is offered by private companies in several countries, including the U.S., Europe and Australia, but not in BC or Canada (Ask Joanne 2012; Wikipedia 2017).

In 1996 ICBC commissioned a technical study that examined its feasibility and impacts (Litman 1997). The results were promising; they demonstrated the actuarial justification for PAYD, identified various benefits and described how it could be implemented. However, ICBC opposed the concept on the grounds that it is unproven and could reduce the corporation's profitability, so no action was taken.

Transportation is the largest single source of greenhouse gas emissions (BC 2016). In 2011 the Pacific Institute for Climate Solutions (PICS) published, *Pay-As-You-Drive Vehicle Insurance in British Columbia* (Litman 2011), which provided support for PAYD as a climate change emission reduction strategy, but no action was taken due to ICBC opposition. The recent ICBC review identified "usage-based pricing" as a possible safety and cost saving strategy (Ernst & Young 2017).

PAYD insurance was recently recognized as a potential provincial traffic safety strategy (Kendall 2016).

PAYD is particularly appropriate in British Columbia because ICBC has a social mandate, and so should favor policies that maximize affordability, safety, and environmental protection. This is a good time to consider PAYD in BC because crashes and insurance premiums are increasing and the province is looking for innovative traffic safety and emission reduction strategies.



Frequently Asked Questions

How is it applied?

Basic PAYD (the system we recommend) changes the unit of exposure from the *vehicle-year* to the *vehicle-kilometer*, so for example, rather than paying \$1,000 annually a motorist pays 5¢ per kilometer, based on odometer readings verified by brokers or a digital photo. At the beginning of the policy term motorists pay for a year's worth of insurance, as they do now, and settle when the policy is renewed: if they drove less than their prepaid kilometers they receive a rebate, if they drove more they owe for the unpaid kilometers, at a slightly higher rate (say, 5.3¢ per additional kilometer) to account for ICBC's foregone interest. It could be a consumer option or implemented on all personal vehicles.

How are per-kilometer premiums calculated?

Premiums are calculated by dividing current annual premiums by average annual kilometers for each rate class. ICBC premiums currently average \$1,280 per vehicle-year and personal vehicles average about 20,000 annual kilometers, so PAYD premiums would average about 6.4¢ per kilometer. All existing rating factors are included, so a motorist who currently pays \$1,600 annually would pay twice per kilometer as one that pays \$800 annually.

How does it affect vehicle travel?

The 6.4¢ per kilometer average PAYD premium is equivalent to a 64¢ per liter fuel price increase, although it is not a new fee, just a different way of paying an existing fee. Based on experience with other transportation price changes, experts predict that PAYD pricing would reduce affected vehicle-travel 10-15%, with greater reductions by higher risk motorists who pay higher annual premiums.

Aren't other risk factors more important than mileage?

Annual mileage is one of several significant risk factors. It would not be actuarially accurate to use mileage *instead of* other rating factors, by charging all motorists the same per-kilometer premium, but premiums become far more accurate if mileage is incorporated with other rating factors through PAYD pricing.

Who benefits? Who loses?

PAYD insurance can provide direct and indirect benefits:

- Motorists who currently drive less than their rate-class average save money.
- Motorists who currently drive their rate-class average and reduce their mileage also save money.
- Motorists who drive significantly more than their rate-class average could pay higher premiums but will benefit most from reduced congestion and accident risk.

How does PAYD affect lower-income, suburban and rural motorists?

Since annual vehicle travel tends to increase with income, and lower-income motorists tend to be price sensitive, PAYD tends to be very progressive with respect to income. PAYD insurance rates reflect territory (where motorists reside); suburban and rural motorists pay less per kilometer, reflecting their lower claim costs. As a result, most suburban and rural motorists would save money and enjoy other benefits from reductions in total vehicle traffic including reduced congestion and accident risk.

How does PAYD affect traffic safety?

Extensive research indicates that PAYD pricing could provide large safety benefits. Since higher risk motorists pay larger premiums, they should reduce their mileage more than average, and since most casualty crashes involve multiple vehicles, crashes and claim costs should decline more than mileage. Even motorists who do not reduce their mileage would be safer if others drive less.

Information Resources

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