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Pay-As-You-Drive Pricing In British Columbia

Backgrounder

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Summary

Pay-As-You-Drive (PAYD) pricing means that a vehicle's insurance premiums and registration fees are based directly on the amount it is driven. PAYD is an innovative, fair, cost-effective, easy way to increase transport system efficiency, providing many environmental, social, and health benefits. PAYD pricing is particularly appropriate in British Columbia as an emission reduction strategy. As opposed to many other approaches, it has no technological, financial or practical barriers, and could be implemented in time to help meet Kyoto targets. This short paper describes PAYD, summarizes its history in BC, and describes how PAYD pricing can help achieve provincial objectives. This is part of a new campaign to encourage ICBC to implement a PAYD pilot project to evaluate the concept.

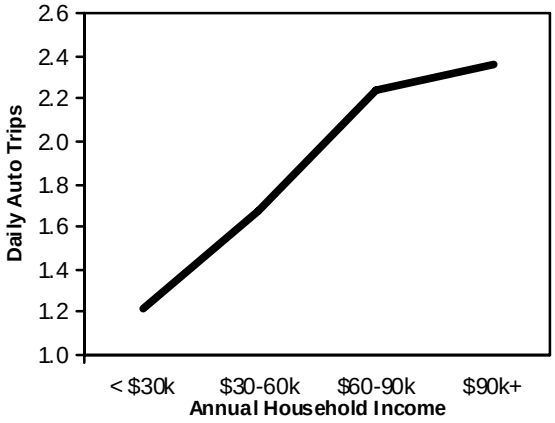
Description

Pay-As-You-Drive (*PAYD*, also called *distance-based* and *per-mile*) pricing means that vehicle insurance premiums and registration fees are based directly on the amount it is driven. Existing rate factors are incorporated. For example, a $500 annual premium becomes 2.5¢ per km, and a $2,000 annual premium becomes 10¢ per km. An average motorist would pay about 7¢ per km. Shifting from current pricing to PAYD insurance and registration fees should reduce affected vehicles' average annual mileage by 10-15%. PAYD fees are easy to calculate: simply divide existing annual fees by the average annual mileage of each vehicle class (typically about 20,000 annual kilometers).

PAYD pricing is not a new fee, just a different way to pay existing fees. It can be a consumer option, so motorists choose the price structure that best meets their needs, similar to telephone and internet rate options. It can provide many benefits:

- Reduces per capita fuel consumption and pollution emissions. If fully implemented would reduce vehicle emissions about 10%, achieving approximately a third of Kyoto targets.
- Reduces crashes and casualties. Because it gives the highest risk motorists an extra large incentive to reduce mileage—reducing overall traffic density—it provides particularly large safety benefits. If fully implemented it could reduce 12-15% of crashes, saving 50-70 annual lives and hundreds of millions of dollars in costs in BC.
- Increases fairness, since premiums on each vehicle more accurately reflect its claim costs.
- Reduces traffic congestion, and road and parking facility costs, and urban sprawl.
- Compliments efforts to improve fuel efficiency and encourage the use of hybrids. Since increased fuel efficiency reduces vehicle operating costs, it encourages people to drive more annual kilometers (called a *rebound effect*). PAYD helps offset this effect, thus increasing the net benefits of increased fuel efficiency.
- Increases insurance affordability. PAYD allows motorists to save money when they reduce their mileage. This reduces total crash costs, rather than just shifting costs between rate classes. An average motorist would save about $120 annually, representing the cost savings that result from reduced mileage. Since lower-income motorists tend to drive their vehicles less than average (Figure 1), it is progressive with respect to income.

Figure 1 **Daily Vehicle Travel By Income** (GVRD Travel Survey Data)

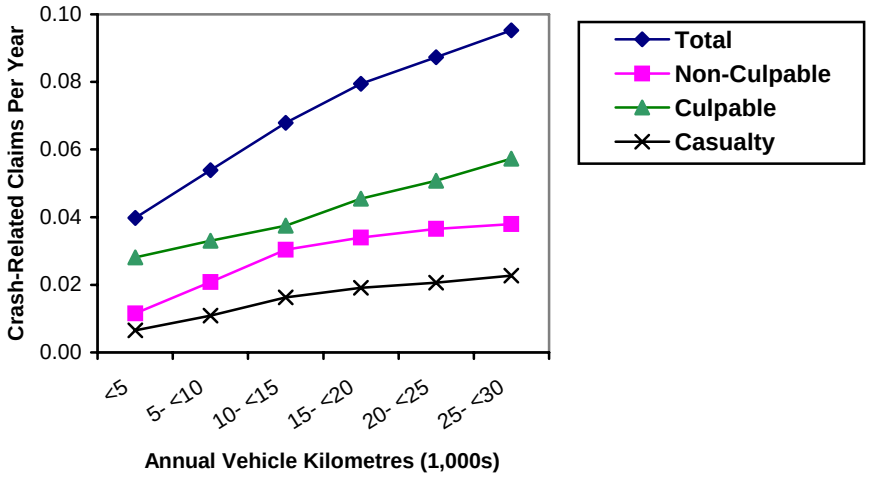


Per-vehicle travel increases with income.

PAYD pricing reflects the economic principle that *prices* (what consumers pay for a good or service) should reflect *costs* (the cost of producing that good or service) unless a subsidy is specifically justified. Extensive research indicates that for a given rate class, annual crashes costs increase with annual mileage (Figure 2), that is, with increased *exposure* (Vickrey, 1968; Edlin, 1999; Litman, 2001). This has two implications:

- Motorists who drive less than average annual kilometers for their rate class pay more than their fair share of insurance costs, while motorists who drive more than average underpay.
- Reductions in annual mileage can reduce crashes and claim costs.

Figure 2 **Crash Rates by Annual Vehicle Mileage** (Litman, 2001)



Crashes per vehicle tend to increase with annual mileage.

With current pricing, claim cost savings that result when motorists reduce their mileage are retained as profits by insurers or returned to premium payers as a group. With PAYD pricing these savings are returned to the individual motorists that reduce mileage. The less you drive the more you save, reflecting the crash cost savings that result.

Figure 3 **Efficient Pricing Gives Consumers More Opportunities to Save**

Current Pricing	**Efficient Pricing**
Motorist Reduces Vehicle Trips	**Motorist Reduces Vehicle Trips**
⇩	⇩
Reduced Crashes and Claim Costs	**Reduced Crashes and Claim Costs**
⇩	⇩
Cost Savings	**Cost Savings**
(Dispersed to all motorists within the rate class)	(Returned to the individual motorist)

With current insurance pricing, crash cost savings from reduced driving are dispersed to all motorists in their rate class. PAYD pricing returns more savings to individuals who reduce their driving. This rewards motorists for reducing mileage and makes premiums more accurately reflect the insurance costs of each individual vehicle.

PAYD pricing gives motorists a new opportunity to save money. To illustrate this, consider the situation of a low-income worker who becomes unemployed and so drives fewer miles. With current pricing they continue paying the same insurance premiums, although both their income and crash risk have declined. With PAYD pricing, unemployed workers who reduce their mileage pay lower premiums, while still being able to insure a car for essential trips, job searches, and temporary employment.

PAYD pricing provides greater total economic, social, and environmental benefits than emission reduction strategies that simply increase vehicle fuel efficiency, as illustrated in Table 1. As a result, PAYD pricing is a very cost effective emission reduction strategy.

Table 1 **Comparing Emission Strategies** (Litman, 2007)

Planning Objective	PAYD	Alternative Fuels and Efficient Vehicles
Congestion Reduction	✓	
Road and Parking Cost Savings	✓	
Consumer Cost Savings	✓	
Reduced Traffic Accidents	✓	
Improved Mobility Options	✓	
Energy Conservation	✓	✓
Pollution Reduction	✓	✓
Physical Fitness & Health	✓	
Land Use Objectives	✓	

PAYD reduces total vehicle mileage and increases use of alternative modes, and so supports many planning objectives. Alternative fuels and fuel efficient vehicles provide fewer benefits.

Because PAYD provides diverse benefits, it can gain support from diverse stakeholders. For example, PAYD pricing is recommended by actuaries (CAS, 1996, pages 35, 242 and 250), economists, the National Organization for Women, consumer advocates, the U.S. Department of Transportation, various cities and regional governments (including Vancouver and the GVRD), environmental groups, energy conservation advocacy organizations, and the National Motorists Association.

Implementing PAYD

Below is a brief description of how PAYD pricing can be implemented. For more details see Butler (1992), Litman (1997) and Funderberg, Grant and Coe (2003).

Pay-as-you-drive fees are calculated by dividing existing annual fees by the average annual mileage of each vehicle class (typically about 20,000 annual kilometers). The policy term begins and ends when a broker or service station performs an *odometer audit*, which involves recording odometer readings and checking for signs of tampering. This should take less than 5 minutes and cost less than $10, and could usually be performed during scheduled maintenance such as an oil change or emission inspection. Motorists would prepay for the kilometers they expect to drive during the policy term, and settle accounts at the end of the term. For example, a motorist who prepaid $1,000 for 20,000 kilometres would receive a $250 credit if they only drove 15,000, and owe $250 if they drove 25,000 kilometres, which must be paid to reregister the vehicle. Rates could be structured to encourage prepayment, for example a 10% premium on kilometers paid after the policy term. No other administrative changes are needed.

Insurance, registration and licensing fees combined average about $1,400 annually per BC vehicle, and so would average about 7¢ per vehicle-kilometer with PAYD pricing. Applying standard price elasticity values, PAYD insurance and registration pricing should reduce affected vehicles' average annual mileage by 10-15%. If applied to all private automobiles this would achieve more than a third of their Kyoto emission reduction targets, reduce crashes by 12-15% (saving 50-70 lives annually in BC), while also reducing traffic congestion, roadway costs and consumer costs.

Several private insurance companies in other jurisdictions already offer PAYD, demonstrating that it can be attractive to consumers and financially successful. Most current PAYD programs use electronic transponders that track vehicle travel, allowing premiums based on time and location. This can allow even greater actuarial accuracy, but it significantly increases administration costs, adding $50 to $100 per vehicle-year, and raises privacy concerns. In addition, Progressive Insurance holds a patent on this type of pricing so users would need to pay royalties. As a result, the potential market and total benefits of this type of pricing are much smaller than for simple, odometer-based PAYD.

ICBC could start with a pilot project, for example, 1,000 volunteers the first year, 2,000 the second, 4,000 the third, 8,000 the fourth, until it is eventually available to any motorist. PAYD pricing is particularly appropriate for ICBC because:

- ICBC is a public organization with a mandate to support provincial objectives such as traffic safety, consumer affordability and environmental quality.
- ICBC insures all vehicles in the province and so would receive the total cost savings from mileage reductions, including vehicles that choose PAYD pricing and those that do not.
- British Columbia does not produce motor vehicles or refine petroleum so fuel conservation provides particularly large economic benefits in this province.
- This is an opportunity for BC to demonstrate innovation and leadership.
- A pilot project is the ideal way to test the feasibility and effectiveness of PAYD.

Responses to Common Questions and Concerns

There is considerable confusion about PAYD pricing. Many objections are either technically inaccurate or can be addressed through program design. Below are responses to common questions.

Insurance pricing already incorporates mileage.
Although some insurance companies incorporate mileage-related rate factors such as commute distance or estimated annual mileage, these do not accurately reflect actual crash impacts and so they fail to give motorists accurate incentives to reduce mileage and crashes.

Other rating factors have more effect on crashes than mileage.
Whether mileage is more or less important than other risk factors is irrelevant since PAYD pricing incorporates other rating factors. Abundant research shows within a rate class, annual crash rates increase with annual mileage.

It is unfair to suburban and rural motorists, who would pay more and lack public transit.
Since PAYD fees are based on the annual mileage of each rate class, only suburban and rural motorists who drive more than average in suburban and rural areas would pay more; about half would save. Even without transit, suburban and rural motorists can reduce mileage by carpooling and consolidating trips, providing large safety benefits due to high traffic fatality rates in those areas.

People need their cars too much to give them up.
PAYD pricing is not expected to cause people to give up cars. There is extensive evidence that operating costs affect vehicle travel. A moderate (10-15%) mileage reduction per affected vehicle can be expected from PAYD insurance and registration fees.

Consumers will not accept this change.
Several private insurance companies profitably sell PAYD policies, indicating consumer demand. Support should increase as consumers and citizens learn more about its benefits.

Odometer fraud will be a major problem.
Although some odometer fraud may occur, it should be a minor problem overall, with fraud rates comparable to other common consumer transactions, and far lower than with current insurance pricing. Odometers are increasingly tamper resistant, regular odometer auditing should discourage and identify most tampering, and the financial incentive for fraud is relatively low. Insurer's financial exposure would be minimal since odometer fraud voids coverage.

It would increase administrative costs to insurers and inconvenience vehicle owners.
Odometer audits are significantly cheaper than vehicle emission inspections because they require less equipment and specialized training, and can be performed in conjunction with other vehicle servicing. The incremental costs are modest (predicted to be $5-10 per vehicle-year), and far smaller than direct benefits to consumers and society.

Odometer auditing is an invasion of privacy.
Odometer readings are already collected during vehicle servicing, vehicle sales, and crash investigations; odometer auditing simply standardizes this practice. Odometer auditing does not identify when or where a vehicle has been driven, or other private information.

This type of pricing has never been used before.
Several insurance companies now offer PAYD policies, and many use mileage data when rating fleets and commercial vehicles.

Potential Pitfalls and Risks

PAYD raises a few legitimate pitfalls and risks, although all can be addressed through program design and further research.

One potential pitfall would be for ICBC to only offer GPS-based PAYD, with electronic instruments that track each vehicle's travel. This would significantly increase program costs and raises privacy concerns, and so greatly reduces the potential market. If GPS-based pricing is tested, it should be offered in addition to simple odometer-based pricing, so consumers can choose the option they prefer.

The greatest risk to ICBC would occur if program participants significantly reduced annual mileage and therefore premium payments without providing proportionate reductions in crashes and claim costs. For example, if participants averaged 15,000 annual kilometers and so paid 25% less in premiums, but their crash rate only declined 10%, ICBC would be financially worse off. However, this problem can be addressed by adjusting rates as needed to accurately reflect actual per-kilometer insurance costs. For example, it may be necessary to raise the rates from 7¢ to 8¢ per vehicle-kilometer. By starting with a relatively small pilot project, the financial risk to IBCB would be minimal.

To the degree that lower-annual-mileage motorists as a group overpay their claim costs (what the insurance industry calls "cream"), as they shift to PAYD pricing the funding available to cross-subsidize higher-annual-mileage motorists would decline, so the rates for conventional, fixed-price insurance may need to increase. Over time, this would raise the annual mileage level at which motorists would find PAYD financially attractive. For example, the first year, PAYD may attract motorists who drive up to 18,000 annual kilometers, but after a few years it may be attractive to those who drive up to 20,000 annual kilometers, and after six years it may be attractive to motorists who drive up to 24,000 annual kilometers, reflecting higher costs of insuring a group of higher-mileage vehicles.

Some people raise concerns about odometer fraud risk, since motorists could save money by rolling back odometers, but other, much larger transactions are already based on odometer readings, such as vehicle warranties, lease fees and used vehicle sales. Odometers are now highly tamper-resistant and most types of fraud could be detected during annual audits and crash investigations. Odometer auditing should provide data comparable in accuracy to that used in other common commercial transactions.

If PAYD pricing is a consumer option, crash rates would be affected by self-selection, that is, by the types of motorists who would choose this price structure. Per-mile fees may need to be adjusted to reflect the risk profile of this group. If participation is only attractive to a small pool (as would be the case with GPS-based pricing), their profiles may differ significantly from the overall average. As the pool expands, their profiles should approach the overall average.

History

PAYD pricing has been proposed numerous times for various reasons. Insurance actuaries have always known that mileage is an important risk factor and so premiums should directly incorporate mileage, but insurance companies are reluctant to require motorists to provide verified mileage readings and so they use mileage surrogates, such as home location (urban, suburban or rural) and commute distance. Many insurance companies ask motorists to estimate their annual mileage, but since this is never verified most motorists significantly underestimate this value so the results are extremely inaccurate and virtually worthless for pricing purposes.

Noble Economics Prizewinner William Vickrey proposed PAYD in the late 1960s in order to make insurance more fair and efficient (Vickrey, 1968). During the 1970 and 1980s, PAYD pricing was advocated as a way to make insurance pricing more equitable (Butler, 1992) and as an energy conservation strategy (Wenzel, 1995).

In 1990s various researchers and government organizations investigated PAYD insurance pricing (Litman, 1997; Baker and Barrett, 1998). This research indicated that, all else being equal, vehicle crashes and insurance costs increase with annual mileage, justifying PAYD pricing (Edlin, 1999; Litman, 2001). In the late 1990s, the Progressive Insurance Corporation implemented a PAYD pricing pilot project using vehicle-tracking technology, which demonstrated the concept's feasibility and market demand. A number of other insurance companies have followed, including Norwich-Union in the UK, General Motors/On-Star in the US, Nedbank and Holland Insurance in South Africa, and Aviva in parts of Canada. However, most of these programs use electronic monitors to track driving patterns, and only offer modest incentives to reduce mileage (typically less than one cent per kilometre reduced, which is much smaller than the actuarially accurate value). PAYD insurance is currently unavailable in British Columbia.

In recent years PAYD pricing has been promoted as a way to reduce congestion, accidents, energy consumption, and pollution emissions (Vonk, et al., 2003; Funderberg, Grant and Coe, 2003; Parry, 2005; Hagerbaumer, 2004). It has been endorsed by the National Motorists Association,[1] the National Association of Independent Insurers, regional governments, the Oregon/Idaho chapter of the American Automobile Association, the Oregon Consumer League, leading economists, environmental organizations, citizen transportation reform groups and the Interfaith Global Warming Campaign. The US Department of Transportation's Value Pricing program is funding several PAYD pricing studies, including some that involve insurance (USDOT, 2007). Several organizations are now advocating PAYD pricing as a strategy to be included in the provincial Climate Change Secretariat's emission reduction plan.

Pay-as-you-drive insurance has been implemented by:

- Progressive Insurance (United States)
- General Motors/On-Star (United States)
- Aviva (Ontario)
- Polis Direct (Netherlands)
- Norwich-Union (United Kingdom)
- Nedbank and Holland Insurance (South Africa)
- Aioi Insurance Company (Japan)

[1] *NMA Position on Auto Insurance*, National Motorists Association (www.motorists.org/insurance).

Action (Or Lack Thereof) by ICBC

Various organizations have asked ICBC to investigate, test and implement PAYD pricing, including the Greater Vancouver Regional District (GVRD, 2005). ICBC sponsored research concerning PAYD insurance but has never released the results.[2] ICBC currently has no official policy on PAYD pricing or plans to implement a PAYD pilot project. To explain this resistance, ICBC officials have expressed various objections including uncertainties about the relationships between mileage and claims, the degree to which motorists would reduce mileage in response to PAYD pricing, difficulties collecting reliable mileage data, and the possible burden it could place on higher-mileage motorists. Many of these objections are technically inaccurate (see *Responses To Common Questions and Concerns*, in this paper and references listed below) or can be addressed in program design. If ICBC officials really have questions about PAYD they should support a pilot project to answer them.

In an Internet poll by a major Vancouver media corporation asking, "Should ICBC offer PAYD Insurance," 61% (600) of respondents said *yes* while only 39% (376) said *no* (www.news1130.com/news/topstory/article.jsp?content=20070906_151654_5792).

Interest in PAYD pricing is growing among transportation professionals, public officials, motorists and the general public due to its many benefits. More insurance companies are offering PAYD pricing, providing more evidence that it is technically feasible, desired by consumers, and financially attractive. PAYD is therefore likely to be implemented increasingly around the world. What is uncertain is whether British Columbia will be a leader or a follower in developing this important innovation.

How To Support PAYD Implementation

Contact ICBC CEO Jon Schubert; Minister of Public Safety Honourable John van Dongen; and if you live in BC, your MLA (www.leg.bc.ca/mla/3-1-1.htm).

- Describe PAYD pricing benefits, particularly with regard to ICBC's stated goals (safety, affordability, fairness), and provincial goals (safety, energy conservation and emission reductions, congestion reduction, physical fitness and health).
- Ask ICBC to share its research on PAYD and implement a PAYD pilot project.
- Request that PAYD be included in ICBC's Climate Change Secretariat submission.
- If the Corporation refuses to act, ask that their objections be explained.

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[2] Research results were presented with ICBC permission at the 1998 conference, *Clean Insurance; The Benefits of Mileage Based Auto Insurance Policies*, by the Economic Policy Institute (www.epinet.org).

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