



Cheaper, Safer, Greener California Auto Insurance: Legislative/Regulatory Outline
IntelliDrive “PHYD-PAYD-Coached:” Pay How You Drive, Pay As You Drive, safety Coached
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1. What's the problem that needs a legislative solution?

- The roads are clogged with commuters who spew too much CO₂. To protect the climate, we must reduce driving with innovative “driving pricing” policies.

2. What's your legislative solution & background information?

2A. Summary:

- To encourage energy-efficiency and reduce greenhouse gasses, implement a “strong form” of Pay As You Drive (PAYD) auto insurance. The four large CA MPOs have requested new “driving pricing” legislation to meet SB375 2020 and 2035 GHG reduction targets.
- This legislative/regulatory outline is a more “insurer-friendly” version than previous green PAYD implementations that did not induce many drivers to purchase PAYD policies. The proposal differs because: a) it provides much larger financial incentives to insurers, b) it comprehends current trends, c) it provides more flexibility for insurers to compete. Green PAYD can more easily achieve widespread adoption with support from insurers.
- The policy reduces CA GHG by 6M tons per year and provides annual economic GAIN of \$4.5B.
- This policy was invented by Cities21 and springs off the “NRDC/EDF/CERES PAYD Standard” and Allen Greenberg “designing PAYD policy incentives” policy family tree.

2B. Background

1. There is a steady, inexorable increase in in-vehicle computers with in-dash displays (often called “telematics”), such as GM OnStar and Ford/Microsoft Sync. These systems can track location (GPS) and communicate with remote software applications (cellular data). These systems improve navigation, congestion avoidance, safety, entertainment, and bridge/highway toll payment. US DOT leads the effort for new applications, standards, and interoperability, under the “IntelliDrive” brand. US national policy promotes this advanced technology for various economic reasons, including job creation and increased driver utility. In 2013, US DOT will consider mandating IntelliDrive in all new cars, SUVs, and light trucks. Ubiquitous IntelliDrive in-vehicle hardware, driven by demand for other uses, will essentially provide free PHYD-PAYD-Coached hardware with minimal transaction costs. In contrast, a rough cost guesstimate for Progressive’s MyRate PAYD add-on in-vehicle hardware is \$100 per vehicle.

2. With PAYD, drivers who drive less pay less, and drivers who drive more, pay more. With the specific “strong” PAYD advanced in this outline, 70% or more of auto insurance cost varies with miles driven, creating sufficient pricing motivation to reduce driving by 6%. (Brookings’ Hamilton Project estimates 8% less VMT for 100% variable.)

The insurance industry is technologically ready to implement PAYD. A majority of auto insurers have “weak flavor” PAYD prototypes or pilot projects. “Weak flavor” does not reduce driving significantly.

Driver risk may be priced into both the fixed and variable portions of PAYD. For example, a low-risk driver driving 12,000 miles per year might pay \$500 per year in combined fixed and variable portions. A very high-risk driver driving the same amount might pay four times as much.

“All purpose” insurers with Property and Casualty lines may support PAYD as a cost-effective way to reduce GHG as a means to reduce Property and Casualty claims caused by climate change in future decades.

3. With PHYD, insurers measure and price driver risk more accurately, reducing loss-making policies while increasing money-making policies. IntelliDrive allows new measurements of risky driving behaviors, for example:

- Poor maintenance such as a) driving with tires at dangerously low pressure, b) driving with dangerously worn brakes
- Repeatedly taking sharp curves at unsafe speeds, where sensors detect partial loss of traction
- Repeated sharp braking to avoid collisions
- Slaloming back and forth across four highway lanes in heavy traffic.
- Driving without seat-belt fastened.
- Excessive speed and excessive speed in temporary construction zones.

The industry has sufficient profit motive to adopt PHYD and insufficient profit motive to adopt green PAYD. PAYD provides large economic benefits to society (\$4.5B per year for CA), but insurers cannot turn societal benefits into corporate profits. A 2010 Insurance Telematics Conference for private sector insurers literally had a “100% PHYD, 0% PAYD” agenda until a last-minute change allowed a single presentation mentioning PAYD (FHWA’s Allen Greenberg). Unless the government provides substantial financial incentives to insurers, PAYD will never come about.

4. With “Safety Coaching” the insurance software application provides feedback to the insured on how to reduce risky driving. In the case of young drivers insured by parents, Safety Coaching information provided to both driver and parent has been shown to significantly reduce insurance claims, providing “double economic benefits:” safer kids and lower claims costs.

5. California climate protection law (AB32/SB375)

The four largest CA metropolitan planning organizations (MPOs) have concluded that, coupled with technological improvements such more fuel efficient autos, the cost of driving must be increased to reduce driving to meet 2020 and 2035 GHG reduction targets. The MPOs have concluded that new legislation/regulation will be required to implement driving pricing. Driving pricing policy political viability will be examined by SCAG and MTC in 2011, in hopes of advising the development of new SB375 implementation legislation.

As far as driving pricing policies, an increase in the gas tax by \$5 per gallon or a \$200 per ton carbon tax are known to be very effective at reducing driving. Neither of these two policies is politically popular. MTC and SCAG are expected to consider cost/benefit of 10 or more driving pricing policies. This PHYD-PAYD-Coached legislative outline has a one-time cost of \$50M while providing annual benefits of \$4.5B (a Net Present Value of \$57B at a 7% discount rate). It is expected that PAYD will rank close to the top in cost-effectiveness. In contrast, other driving pricing policies may be “job killers” with negative NPV.

Note that adoption of “weak flavor” PAYD forces implementation of other, less cost-effective driving pricing policies. In essence, “weak flavor” PAYD represents a missed opportunity for cost-effective GHG reduction.

6. 1% CA market share creates a tipping point for PHYD-PAYD.

This legislative outline pays \$200 for each insurance policy switched to PHYD-PAYD, with a cap of 250,000 policies (a bit more than 1% of 22M licensed CA drivers). Because PHYD-PAYD provides more accurate risk pricing than traditional underwriting, PHYD-PAYD policies have a competitive advantage over traditional policies. The invisible hand of corporate profit-seeking will then sweep through the rest of insurance policies as they turn over. It is expected that 60% of policies will turn to PHYD-PAYD within five years of the tipping point, with 98% PHYD-PAYD policies in ten years.

7. Data Protection / Privacy

iPhone’s Yelp application uses very personal information (current location and restaurant preferences) to recommend simultaneously appealing and convenient restaurants. Use of this personal information is only

permitted when the user affirmatively “opts in.” Opt-in only occurs when the user is convinced of the benefit of providing personal information. For PHYD-PAYD-Coached, the default will be “opt-out” PAYD using manual odometer reading. Successive layers of IntelliDrive features (PAYD first, then PHYD or Coached) may be separately opted-in at a drivers’ discretion.

One bad apple can spoil an entire basket of apples. There are currently no known data protection “bad apples” in the insurance industry. The industry has an unmatched record of implementing best practices for protecting sensitive personal data. Insurers will ensure this record continues by agreeing to a high bar for data protection best practices (these are already implemented) and for stiff breach-detering fines for unauthorized data release. It is in the industry’s financial interest to create a barrier to entry for sloppy companies with shoddy data protection (similar to how the BP oil spill restricts Exxon’s ability to drill new wells).

8. Consumer/driver comparison shopping

Some PHYD-PAYD policies will lend themselves better to rapid price estimation for consumer comparison shopping than other PHYD-PAYD policies. To accommodate comparison shopping, IntelliDrive enables insurers to offer installable price quoting applications to measure driver behavior and provide price quotes based on that behavior. A driver might have a policy from insurer A while running insurer B’s price quoting app. The driver could then compare A to B in a head-to-head battle.

For companies that protect their PHYD-PAYD underwriting formula as a trade secret, an IntelliDrive price quoting application enables comparison shopping without exposing underwriting formulae to competition.

9. Please see Section 8 below for “PAYD Background Details”

2C. Legislative Solution Outline

10. The California State Insurance Commissioner shall allow only “strong” PAYD policies where, for a driver driving the average mileage (12,000 miles per year), 70% or more of insurance cost will vary as a function of miles driven. Policies lower than 70% variable do not provide sufficient driving reduction to contribute towards meeting societal objectives found in CA climate law.

PAYD policies must be billed six or more times per year, because the more driving pricing feedback that is given, the greater the reduction in driving.

The variable cost of individual miles may vary, but may not vary by more than 100%. IE an insurer might charge \$0.10 for the first 12,000 miles, and \$0.05 for miles thereafter. This variability allows for creative products while still maintaining driving reduction motivation.

There are five product flavors that the Insurance Commissioner may certify and that will qualify for incentives:

- a) PAYD via manual odometer readings, without PHYD or Coaching.
- b) PAYD via IntelliDrive, without PHYD or Coaching
- c) PAYD, safety Coached via IntelliDrive, without PHYD
- d) PAYD, PHYD via IntelliDrive, without Coaching
- e) PHYD-PAYD-Coached via IntelliDrive

An insurer may develop only #a and still qualify for incentives. #b cannot be offered without also offering #a. #c and #d cannot be offered without also offering a-b. #e cannot be offered without also offering a-d.

11. California Legislature shall provide funding to allow for an orderly transition from traditional auto insurance to PHYD-PAYD-Coached. The funding plan is detailed in Section 3 below. Funding includes a \$3 per policy fee charged by the auto insurers. This fee applies for 24 months and produces \$132M for auto insurers to use in developing new products. \$20M in incentives where \$200 will be provided for each new, strong PAYD policy (up to the \$20M cap), where all household members must be covered. Otherwise, households can “game” the insurance between traditional and PAYD-insured autos. To avoid gaming, as in Oregon, the insured is required to sign a pledge certifying that all household members are covered. .

The \$20M incentive scheme creates a “cut-throat race” to increased profits between insurers. Not all insurers will receive incentive payments.

12. The Insurance Commissioner should make efforts to encourage creative variations/exceptions by insurers, provided that the same substantial driving reduction can still be achieved. One example is dramatically raising the cost per mile driven for exceptionally dangerous miles, such as miles driven by 18-23 year-olds between 11PM and 5AM. This price increase has been shown to increase safety. Another example is allowing variable charging per minute of driving, rather than per mile of driving. (Per minute charging will also motivate reduced driving.)

13. The Insurance Commissioner shall implement Data Protection and Privacy as outlined in #8 above.

14. California Legislature shall provide IntelliDrive innovation grant funding for a specific PHYD-PAYD-Coached technology achievement: Two competing auto insurers developing PHYD-PAYD-Coached on an IntelliDrive-compatible in-vehicle hardware platform where comparison price quoting applets are also provided.

15. There are many variations to this legislative outline that would be acceptable and still achieve 6% VMT reduction.

3. Orderly Auto Insurance Market Transformation from Traditional to PHYD-PAYD-Coached

The funding and implementation strategy outlined in this section SUPERSEDES the strategy outlined in the rest of this paper.

Objectives

For this discussion, we will analyze the impact of PHYD-PAYD-Coached on a hypothetical private sector auto insurance company named “InsurerX.” In this section, we will use “PAYD” as shorthand for “PHYD-PAYD-Coached.”

CA can regulate an orderly, “negative cost” market transformation.

InsurerX will surely be skeptical of the effectiveness of government regulation. InsurerX will expect that unintended consequences will arise. InsurerX will immediately understand that high-annual-mileage drivers will have incentive to cling to traditional policies that subsidize high-mileage drivers, resulting in reduced profits.

We know that some of the full-line insurers lose money on auto insurance in order to sell home insurance. Would the discrepancies in insurer business models lead to “dis-orderly” behavior where some insurers gained market share? Surely InsurerX will play out the responses of all the different insurers in their head and will be thinking about insurers that might be unpredictable or predatory.

This narrative provides reassurance to InsurerX that PHYD-PAYD-Coached will lead to an orderly market transformation.

CA PAYD Market Transformation Funding Solution

Here is a new, “stronger” funding scheme. This funding scheme greatly assists the market transformation narrative.

3.1) **A \$3 per policy per year “cheaper, safer, greener auto insurance market transformation fee”** is legislated/regulated by the State, in place for a limited time period of 24 months. This fee is collected by auto insurers to fund development of new PAYD policies. No revenue goes to the state. A separate “transformation fee” line item appears on the insurance bills that consumers receive.

Within CA’s extreme policy constraints, a “state-sanctioned private sector fee” is achievable without running into the Prop 26 two-thirds vote requirement. An example of an existing fee of this nature, the “Auto Dealer’s Document Preparation Service Fee,” is provided in the box below.

CA has roughly 22M drivers and 22M cars. The \$3 per policy fee over two years generates \$132M for auto insurers to underwrite and develop new PAYD policies. A cost-estimate for an insurer's cost of developing a PAYD policy ranges from \$3M to \$6M. Hence, the policy is "negative-cost" to the auto insurance industry.

Example: Auto Dealer's Document Preparation Service Fee (CVC §11713.1)

Dealers may charge buyers a document preparation service fee not to exceed \$55.

This fee is not required or collected by the CA DMV and it is unlawful to represent this charge as a governmental fee.

From: http://dmv.ca.gov/pubs/reg_hdbk_pdf/ch3_collection_payment_of_fees_penalties.pdf

3.2) A "pot" of \$20M is provided in a competitive free-for-all that is winnable only by the most nimble of insurers. A \$200 tax credit is provided to insurers for each of the first 100,000 verifiable policies that are changed to strong flavor PAYD. It is conceivable, though unlikely, that a single insurer may collect the entire \$20M.

Within CA's extreme 2011-2012 \$25B budget shortfall constraints, a "gimmick" is used for \$20M in budget. Insurers that provide verifiable proof of strong-flavor PAYD policies obtain a tax credit that may be redeemed 36 months in the future. The gimmick pushes the budget hit into the future, whereas a 2012 budget hit is politically untenable.

Reassuring Market Transformation Implementation Narrative for InsurerX

POLICY IMPLEMENTATION PHASING

- Insurers report an audited number of strong-flavor PAYD policies and traditional policies to CA Insurance Commissioner on X date each year.
- At month 6, insurance commissioner pre-approves automatic 8% price increase on all traditional auto insurance 1,500-page policy "filings."
- At month 18, if an insurer does not have 25% PAYD policies, then the traditional policy filing becomes invalid. That insurer may not sell any traditional insurance. Insurance commissioner pre-approves an additional 8% price increase on traditional auto insurance policies.
- At month 30, if an insurer does not have 50% PAYD policies, then the traditional policy filing becomes invalid. That insurer may not sell any traditional insurance. Insurance commissioner pre-approves an additional 8% price increase on traditional auto insurance policies.
- At month 42, if an insurer does not have 75% PAYD policies, then the traditional policy filing becomes invalid. That insurer may not sell any traditional insurance. Insurance commissioner pre-approves an additional 8% price increase on traditional auto insurance policies.
- At month 54, all traditional policy filings are invalid. Only PAYD is allowed.

Auto insurance policies typically renew every 6 months, so there are two chances per year to switch a policy from traditional to PAYD.

Because traditional insurance policy prices increase with the phasing, high-mileage drivers are motivated to switch to PAYD in an orderly manner.

Due to the \$20M prize, insurers will likely begin developing strong flavor PAYD policies in advance of regulatory/legislative policy adoption, because there will be a "race" to win the prize.

The \$3 per year per policy transformation fee results in insurers with larger market shares receiving more funding to develop PAYD policies. This is as it should be for an orderly market transformation. Large market share insurers have out-competed other insurers in developing attractive traditional insurance policies. Now these "fittest" of competitors are assisted by government in maintaining that advantage as the market transforms.

Bi-partisan philosophical note: Implementation sets incentives, then the Invisible Hand takes over

- For consumers, PAYD represents a behavioral economics "nudge," a light-handed (Libertarian, Tea Party-friendly) approach that exposes better pricing information to improve consumer decision-making, resulting in reduced driving to achieve a societal objective. See the book, "Nudge: Improving Decisions About Health, Wealth, and Happiness," by Thaler and Sunstein.

- For auto insurers, the proposed implementation is “negative-cost” and uses a set of phased carrots and sticks to achieve market transformation, gradually nudging the insurance market to achieve a societal objective and to improve driver risk assessment, increasing market efficiency.
- Proponents of this policy are clearly “friend of the consumer” and “friend of the insurer.”

4. Similar Legislation

There are a number of early PAYD insurance policies, state regulations, and state laws, including Progressive Insurance’s MyRate policy, General Motors’ OnStar policy, MileMeter’s policy, Puget Sound’s pilot, Oregon’s state law with tax benefits for insurers who develop such policies, and California’s 2009 voluntary PAYD statewide insurance regulation. Oregon provided tax benefits to virtuous insurers, but the incentives were insufficient to motivate insurers. In addition, “all the other big insurance players - AAA, Allstate, State Farm, Hartford, Erie Insurance, MetLife, Safeco, American Family, Farmers – are in development or beta mode.” (from Telematics Update). PAYD innovation has also occurred in Canada, Netherlands, UK, Japan, Finland, Australia, Germany, and South Africa. As a whole, these pioneering efforts have not been effective and have reduced driving by less than 0.1% in the areas where they are applicable.

In the stalled US House of Representatives 2005 bill #HR4640, The Future Fuels Act, by Representative Gerlach, Section 402 included incentives for insurers to develop PAYD policies.

5. Financial Impacts

This PHVD-PAYD-Coached legislative outline has a one-time cost of \$50M while providing annual benefits of \$4.5B (a Net Present Value of \$57B at a 7% discount rate). It is expected that PAYD will rank close to the top of driving pricing policies for cost-effectiveness. In contrast, other driving pricing policies (such as \$5 per gallon gas tax increase) may be “job killers” with negative Net Present Value.

Says Brookings PAYD study author Pascal Noel. 64% of California households would have lower premiums under PAYD, with an average savings of \$276 annually per vehicle. Low income residents, in particular, would benefit. (From: <http://latimesblogs.latimes.com/bottleneck/2008/08/pay-as-you-driv.html>). Assuming 22M autos in CA, one for each of 22M licensed drivers, the annual California consumer savings is \$6.0B.

Multiple constituencies are affected by driving pricing policies. All driving pricing legislation development should analyze the impact on the affected constituencies.

6. Supporters

- As part of comment on SB375 targets, the four largest CA MPOs have requested driving pricing legislation to implement SB375.
- On Aug 31, SCAG’s Greig Asher (formerly with VTA) indicated informally that SCAG favors PAYD as a cost-effective policy to help meet SB375 targets.
- NRDC, Ceres, EDF, Victoria Transport Policy Institute, Institute for Transportation and Development Policy, the Conservation Law Foundation, and Calstart have developed a PAYD standard. This standard was developed to help move “weak PAYD” policies to become much stronger at reducing VMT/GHG.
- Twelve of 33 US state climate action plans explicitly recommend PAYD insurance implementation (AZ, CA, CO, MD, ME, MN, NH, NM, NC, RI, VA, and VT).
- “The assumption that the costs of climate recovery will be prohibitively high simply does not stand up to scrutiny. A study by McKinsey & Company last year documented large opportunities to reduce U.S. emissions by 2030 that could be achieved with a negative cost — meaning that these represent investment opportunities that would increase the productivity of the overall U.S. economy.” – Carl Pope, Sierra Club
- Re the task of reducing carbon emissions. “There is a fundamental difference in a mind-set that perceives what is needed as massive sacrifice and one that views the challenge as accelerating an economically attractive and sorely needed transition with a carefully designed program of market reform.” – Carl Pope, Sierra Club
- “To my mind, getting widespread implementation of PAYD insurance is the single most effective thing that America can quickly do to reduce traffic and pollution from driving. It would save the majority of

households money, cut dependence on oil imports, reduce accidents and health costs, and provide early action to address global warming. If all car insurance premiums were put on a PAYD basis, it could cut greenhouse gas emissions by 8-15%. That's huge. **But getting this result will require government action and incentives to overcome the inertia of the insurance marketplace and state insurance regulations.** — Michael Replogle, former Transportation Director of Environmental Defense (300,000 members); Global Policy Director and Founder of Institute for Transportation and Development Policy.

- “Government incentives to promote PAYD insurance have been projected to be very cost competitive in terms of reduction air pollution and saving lives as compared with other government transportation-related expenditures aimed at achieving these objectives.” “Researchers have projected that PAYD insurance will lead to an 8-20% reduction in VMT, with concomitant reduction in congestion, air pollution, greenhouse gas emissions, and dependency on foreign oil. Further, the potential reduction in crashes and related insurance claims has been projected to be proportionately greater than the VMT reduction.” Allen Greenberg, FHWA’s “non-tolling driving pricing expert.”

7. Opposition

- Koch Industries and Koch/Exxon-funded “conservative think tanks,” Valero, Tesoro, US Chamber of Commerce, Voldemort

For this policy to advance politically within our special-interest controlled political environment, the financial incentives to develop PAYD policies must be such that about half of auto insurers (the first movers) will favor this policy. If there is unanimous insurer opposition, then this policy will likely fail politically. In essence, this policy attempts to pit first mover insurers against laggards.

8. PAYD Background Details

8A. Background Information:

With PAYD, drivers who drive less pay less car insurance, and drivers who drive more, pay more car insurance. Currently, drivers who drive less subsidize insurance for drivers who drive more, creating a perverse incentive to drive more and to emit more GHG. (According to EDF, “traditional insurance offers 15 percent or less mileage-based discounts that don’t typically capture the full benefit [to insurance companies] of driving fewer miles.”) This policy will create a more economically efficient driving insurance market by “internalizing” part of the “negative economic externality” of emitting too much harmful GHG.

Current twice-per-year auto insurance payments are perceived as a “sunk cost.” PAYD requires more-frequent payments, transforming the sunk cost into a variable cost, which then motivates reduced driving. The perceived increase in variable driving costs is roughly equivalent to a \$1.67 per gallon gas price increase (see appendix below).

The Brookings/Hamilton Project’s PAYD report has concluded that “100% variable” PAYD will reduce driving and driving CO₂ by 8%. VTPI suggests that the reduction could be even larger than 8%.

Envisioned is a vigorous, competitive private auto insurance market based on a new and improved underwriting paradigm that saves drivers money. The new underwriting paradigm better comprehends individual driver risk factors. All things being equal, if you are a bad or dangerous driver, you will pay more for car insurance than a safe driver.

Unfair, actuarially-flawed auto insurance underwriting

The auto insurance industry clings to an insurance underwriting paradigm that the state has concluded is both unfair and actuarially unsound. The California Insurance Commissioner issued a 1994 report concluding that the insurers were not basing rates on actuarially sound and defensible bases and that the greatest discrepancy between actual rates and actuarially sound rates was on VMT (vehicle miles traveled). “Most insurers are

currently using rating practices that appear to be arbitrary.” “The failure of current rating practices to assign enough importance to the number of miles a vehicle is driven was a major source of premium variations.” [From: *Impact Analysis of Weighting Auto Rating Factors ...*]

Berkeley transportation consultant Mark Brucker’s analysis shows:

For California, my analysis of rate-setting for some of the biggest insurers shows very low relation of charges to VMT, that the rates are set largely based on weak proxies for safety, such as marital status, gender, location of home (which isn't even necessarily closely related to where you drive), if you have other policies with the company, how long you've been with the company, years of experience.... State Farm, e.g., has two mileage bands only, split at 7,500 miles. From a past auto insurance underwriting analysis, Farmers weights mileage as 5% of the factors affecting rates, Allstate 8%, State Farm 12%. But in each case the actual effect of mileage is substantially decreased by having very little difference between the rates for low and high mileage drivers. Farmers would shift rates by less than 2% for an increase from 3,000 to 10,000 miles per year. For State Farm it was less than 3% except 3% for collision (less for bodily injury and property damage). AAA of Soouthern California appears to charge less in many cases for those who drive higher mileage-e.g. much less for driving over 50,000 miles than 40,000-50,000 and somewhat less for 50,000 than for 20,000-25,000 on bodily. They also, in the most recent filing I have, show they base rates more on gender than any other factor for Comprehensive. There is actually a very strong positive correlation between VMT and comprehensive costs.

A number of years ago I tried to assess how much other factors were overweighted vs. mileage based on data from British Columbia on actual costs vs. mileage. My conclusion was that factors only indirectly related to costs such as academic records, gender, marital status, years with company etc. were overweighted by from 250-500% by State Farm, 370-800% by Allstate and 1100-1500% by Farmers.

How to bring about effective implementation

There are a number of early PAYD insurance policies, state regulations, and state laws, including Progressive Insurance’s policy, General Motors’ OnStar policy, MileMeter’s policy, Puget Sound’s pilot, Oregon’s state law with tax benefits for insurers who develop such policies, and California’s 2009 voluntary PAYD statewide insurance regulation. In addition, “all the other big insurance players - AAA, Allstate, State Farm, Hartford, Erie Insurance, MetLife, Safeco, American Family, Farmers – are in development or beta mode.” (from Telematics Update). PAYD innovation has also occurred in Canada, Netherlands, UK, Japan, Finland, Australia, Germany, and South Africa. As a whole, these pioneering efforts have not been effective and have reduced driving by less than 0.1% in the areas where they are applicable.

To be effective, the following is required:

- Insurance policies must have the proper features to properly motivate drivers to save money by driving less. NRDC, Ceres, EDF, Victoria Transport Policy Institute, Institute for Transportation and Development Policy, the Conservation Law Foundation, and Calstart have developed a PAYD standard. Under this standard, “gold” and “silver” policies are effective.
- This proposal comprehends that auto insurers are very happy (and profitable) with current actuarially-unsound underwriting and, because of a cost barrier to switching to actuarially-sound underwriting, will fight to maintain the status quo. To bring about an efficient auto insurance market, the state will have to subsidize insurers in developing PAYD policies.
- Insurers have not promoted PAYD policies effectively. Insurers fought the 2009 attempt to impose PAYD regulations in California. Experts have concluded that insurers must be financially incentivized to create PAYD products as it may take each insurer upwards of \$3M to create such policies. Therefore California must mandate PAYD insurance for all licensed California drivers and California must motivate insurers to develop such policies. For motivation, the state should pay insurers \$10 for each CA driver who converts to a PAYD policy, for the first 5M CA drivers who switch. Insurer policies will only qualify for \$10 switcher payment if they are offered in all other states where the insurer offers auto policies and where the state allows PAYD. This incentive will create a “race” between the insurance companies to convert policies rapidly. The \$50M in insurer financial incentives costs only a one-time \$2.27 per licensed CA driver. The \$50M could be funded from many sources, including via competitive CMAC funding, CA state transportation funding (bumping off cost-ineffective capacity expansion projects), or increased auto registration fees.

- “To my mind, getting widespread implementation of PAYD insurance is the single most effective thing that America can quickly do to reduce traffic and pollution from driving. It would save the majority of households money, cut dependence on oil imports, reduce accidents and health costs, and provide early action to address global warming. If all car insurance premiums were put on a PAYD basis, it could cut greenhouse gas emissions by 8-15%. That’s huge. **But getting this result will require government action and incentives to overcome the inertia of the insurance marketplace and state insurance regulations.**” — Michael Replogle, former Transportation Director of Environmental Defense (300,000 members); Global Policy Director and Founder of Institute for Transportation and Development Policy.

Implementation Details

- Proposed is sound and flexible underwriting based on individual driver risk factors. The PHYD-PAYD-Coached legislative outline provides substantial opportunity for private sector insurance companies to compete on product features and underwriting skills. Traditional auto insurance underwriting encompasses three separate prices: liability, collision, and comprehensive (comprehensive insures you for losses such as theft of your vehicle). Liability and collision are somewhat obviously positively linearly correlated with VMT. It is less obvious, but also true that comprehensive coverage is also positively linearly correlated with VMT (a VTPI finding).
- Insurer PAYD mileage reporting may be accomplished via:
 - a) newly installed in-car hardware such as Progressive Insurance’s MyRate device that connects via industry standard cable to in-vehicle computers for odometer readings and then transmits mileage readings via cellular telephony,
 - b) GM OnStar hardware is already fully capable without modification,
 - c) US DOT standard “IntelliDrive” in-vehicle telematics hardware will also be fully capable,
 - d) Ford Sync is fully capable,
 - e) frequent self-reporting with infrequent audits verifying odometer readings.
- The state should collect and report data on progress towards bringing about 100% driver adoption of effective PAYD. The state should collect and report data on VMT per driver, tracking the resultant VMT decrease relative to the 8% or greater projected reduction.
- The issue of handling accidents involving uninsured motorists should be handled by this policy’s implementation.
- The California state insurance commissioner shall be encouraged to advocate for the adoption of this climate protecting policy in other states.

8B. Arguments in Favor of PAYD:

1. This is a very cost-effective CO2 reduction policy. If a ton of CO2 is valued at \$30, then the single \$50M policy implementation cost will provide ANNUAL \$253M in CO2 reduction benefits. (Annual CA VMT is significantly understated and is probably more than 280B):

CA population	37,000,000
CA licensed drivers	22,000,000
VMT per capita per year	5,701
CA annual VMT	210,937,000,000
Annual CA CO2 driving tons (20 mpg, 1 lb CO2 per mi)	105,468,500
8% reduction:	8,437,480
Value of annual reduction at \$30 per ton	\$253,124,400

Per capita VMT: <http://www.fhwa.dot.gov/ohim/onh00/bar4.htm>

Twelve of 33 US state climate action plans explicitly recommend PAYD insurance implementation (AZ, CA, CO, MD, ME, MN, NH, NM, NC, RI, VA, and VT).

2. The significant vehicle miles traveled reduction provides an additional \$4.5B per year in benefits beyond GHG reduction from reduced traffic congestion, reduced local pollutants (particulates, etc), improved health, reduced dependence on foreign oil and associated military spending, and reduced accidents. [Calculations from the Brookings Hamilton Project PAYD report].

3. Says Brookings PAYD study author Pascal Noel. 64% of California households would have lower premiums under PAYD, with an average savings of \$276 annually per vehicle. Low income residents, in particular, would benefit. (From: <http://latimesblogs.latimes.com/bottleneck/2008/08/pay-as-you-driv.html>). Assuming 22M autos in CA, one for each of 22M licensed drivers, the annual California consumer savings is \$6.0B.

4. The 6% driving reduction reduces demand for expensive highway capacity increases.

5. The peer-reviewed Moving Cooler report concludes that we must reduce driving (vehicle miles traveled) to meet climate objectives. In the San Francisco Bay Area, ABAG/JPA's Ted Droettboom has stated that even with full implementation of regional smart growth initiatives and full achievement of CAFE, ABAG regional model forecasting cannot meet 2035 CO2 reduction without driving pricing mechanisms that will reduce travel demand.

6. "Because PAYD provides diverse benefits, it can gain support from diverse stakeholders. For example, PAYD pricing is recommended by actuaries, economists, the National Organization for Women, consumer advocates, the U.S. Department of Transportation, various cities and regional governments, environmental groups, energy conservation advocacy organizations, and the Canadian National Motorists Association." – VPTI

7. "PAYD pricing provides greater total economic, social, and environmental benefits than emission reduction strategies that simply increase vehicle fuel efficiency. As a result, PAYD pricing is a very cost effective emission reduction strategy." – VPTI

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.

8. PAYD eliminates gender-based auto insurance price discrimination. The National Organization of Women supports PAYD auto insurance because the current system discriminates against women. "Who are better drivers: men or women? On one end of the stereotype spectrum, some contend that men have natural driving skills and are far better at parking. On the other end, some argue that women are more cautious and less reckless behind the wheel. Government figures show the truth - men and women have the same number of accidents per million miles driven. Driving myths and stereotypes recognize only that men tend to have more car accidents but overlook why - men drive more miles per year on average than women. That fact accounts for the higher accident rate among men than that of female drivers of the same age group. In spite of the relevance of the number of miles driven to collision involvement, auto insurers charge adult men and women the same annual car insurance premiums, which means that women, on average, pay more per mile to insure their vehicles than men do." From: <http://www.insurancerate.com/milemeter-pay-by-mile-car-insurance.php>

9. PAYD is a "pain-free" climate protection policy.

10. PAYD provides a compelling application as part of US Department of Transportation's "IntelliDrive" telematics effort. More specifically, IntelliDrive's "tolling and e-payment" capabilities enable simple, low-cost PAYD implementation.

11. Using terminology from the Reason Foundation's book, *Mobility First*, this PAYD policy:
 - Reduces traffic congestion, increasing worker productivity (less time stuck in traffic results in more time for work and family) and hence, increases US competitiveness in the international economy.
 - Reduces traffic congestion, improving wellbeing (less time stuck in traffic results in more time for family & self).
 - Uses a more accurate pricing mechanism to allow the surface transportation market to adjust to create a more efficient market, overcoming a status-quo-maintaining (stasist) auto insurance technocracy.
12. A 6% reduction in rush hour highway traffic will provide a very substantial improvement in commuting to many Americans.

8C. Arguments in Opposition to PAYD:

1. There are a number of opposing arguments that are based on the denial of scientific evidence for human-caused climate change. We refer climate-deniers to Nobel-prize winner Stephen Schneider's book, "Science is a Contact Sport," as well as the May 2010 special issue of *NewScientist Magazine* entitled "Living in Denial" that explains the psychology of climate denial.

2. In California, many insurers fought effective PAYD regulation in favor of ineffective PAYD. Surely insurers that are laggards in PAYD will be likely to fight a statewide PAYD mandate. The false objection that PAYD somehow restricts private sector firms from competing has been previously addressed in Background Information above.

Effective PAYD will create a major insurance market disruption with some companies being winners and some being losers. Such market disruptions will generally be fought within a capitalistic system, no matter that a huge societal benefit is created. In addition, there is some small threat that automakers (who control the telematics hardware platform) will "disintermediate" insurers, IE take over the insurance business (although it is far more likely that automakers will partner with insurers).

Early adopter firms such as Progressive, Unigard, MileMeter, and GM could potentially be brought in as allies in favor of mandatory PAYD, as they could potentially obtain a competitive advantage over industry laggards.

By reducing the amount of driving that occurs, PAYD will lead to reduced auto insurance industry revenues. However, it is not clear what the impact will be on industry profits.

3. "Libertarian-sounding arguments intending to support the status quo of the current inefficient transportation market and willfully ignoring negative economic externalities." The US private vehicle surface transportation market is highly regulated and poorly regulated and has many perverse subsidies. This market is by no means an efficient or "free" market, hence objections based on "keeping markets free" are not valid.

4. It is hard to change a system that people are used to.

5. "Odometer auditing is an invasion of privacy." Response from VTPI: "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."

8D. PAYD References:

- Entertaining & informative youtube video and petition drive for PAYD insurance in British Columbia: <http://www.paydpilot.ca> .
- The Hamilton Project, "Pay-As-You-Drive Auto Insurance: A Simple Way to Reduce Driving-Related Harms and Increase Equity," http://www.brookings.edu/~media/Files/rc/papers/2008/07_payd_bordoffnoel/07_payd_bordoffnoel.pdf
- "Designing pay-per-mile auto insurance regulatory incentives," by Allen Greenberg. Transportation Research Part D (Transport and the Environment). Volume 14D, issue 6, August 2009, pages 437-445.
- "Impact Analysis of Weighting Auto Rating Factors to Comply with Proposition 103," by Hunstad, Bernstein, and Turem. California Department of Insurance, December 1994. <http://www.insurance.ca.gov/0400-news/0200-studies-reports/0600-research-studies/auto-policy-studies/executive-summary.cfm>

- “Drive More, Pay Less,” http://switchboard.nrdc.org/blogs/jhorner/drive_less_pay_less_the_new_pa.html
- “Pay-As-You-Drive Insurance Product Rating System” by Ceres, NRDC, EDF and others. <http://www.ceres.org/Document.Doc?id=512>
- Failure of CA PAYD regulation: “California Misses a Big Chance with Pay-As-You-Drive,” http://switchboard.nrdc.org/blogs/jhorner/california_misses_a_big_chance.html .
- “Pay as You Drive Pricing Backgrounder,” VTPI, <http://www.vtpi.org/paydbc.pdf>
- “Pay As You Drive: The Future of Auto Insurance,” by Todd Litman, VTPI, NAIC Annual Meeting, 12 June 2009. PPT http://www.naic.org/documents/committees_ex_climate_payd_auto_insurance.pdf
- Jason E. Bordoff (2008), Pay-As-You-Drive Car Insurance, Brookings Institution (www.brookings.edu/articles/2008/spring_car_insurance_bordoff.aspx).
- Ceres (2009), Drive Less, Pay Less: Environmental and Transportation Groups Unveil Performance Standard for Pay-As-You-Drive Auto Insurance, Ceres Investors and Environmentalists for Sustainable Prosperity (www.ceres.org); at www.ceres.org/Page.aspx?pid=1157 .
- Stephen J. Dubner and Steven D. Levitt (2008), “Freakonomics: Not-So-Free Ride,” New York Times, 20 April 2008, (www.nytimes.com/2008/04/20/magazine/20wwln-freakonomics-t.html).
- Allen Greenberg (2009), Costs and Benefits of Varying Per-Mile Insurance Premiums Based Upon Measured Risks Specific to Each Mile Driven, TRB Annual Meeting (www.trb.org); at www.vtpi.org/AG_PAYD.pdf.
- Robin Harbage (2009), Usage Based Insurance-From Theory to Practice, Casualty Actuarial Society (www.casact.org); at www.casact.org/education/rpm/2009/handouts/harbage2.pdf .
- Todd Litman (1997), “Distance-Based Vehicle Insurance as a TDM Strategy,” Transportation Quarterly, Vol. 51, No. 3, Summer 1997, pp. 119-138; at www.vtpi.org/dbvi.pdf .
- METRO (2007), Pay-as-You-Drive (PAYD) Insurance Pilot Project, King County Metro (www.metrokc.gov/exec/news/2007/pdf/Payasyougofacts.pdf).
- William Vickrey (1968), “Automobile Accidents, Tort Law, Externalities and Insurance: An Economist’s Critique,” 33 Law and Contemporary Problems, pp. 464-470; at www.vtpi.org/vic_acc.pdf .
- Frost & Sullivan Report, Pay As You Drive (PAYD) – New Age Vehicle Insurance Based on Core Telematics Foundation, June 6 2007, http://www.frost.com/prod/servlet/market-insight-top_pag?docid=99661873. It is interesting to consider how the NRDC/Ceres gold/silver PAYD standard would support innovative “youth safety” underwriting by Norwich Union. N.U. charges risky 18-23 year-olds by time of day (and possibly by type of road driven). Peak hour has one price. Driving in the dangerous late night driving hours (11PM-6AM) is charged at a very high rate of \$1.50 per hour. Driving during safer daylight off-peak hours is charged at only \$.07 per hour. I would expect that N.U. might have to modify their underwriting to bring about VMT reduction while also achieving safer driving. N. U.’s underwriting can be more aptly characterized as “pay how you drive.”
- Telematics Update, Can Telematics Reinvent Auto Insurance?, March 2010. <http://social.telematicsupdate.com/industry-insight/can-telematics-reinvent-auto-insurance>. The cost per year for Progressive’s MyRate in-car cellular hardware is \$60.
- State Environmental Resource Center, PAYD Talking Points, <http://www.serconline.org/payd/talking.html>. “Two drivers of the same age, sex, and driving history, who drive the same model car, have an equal chance (0.0003% per mile driven) of getting into an accident. Driver A uses his/her car to drive to work for an average of 30 miles per day, plus another 50 miles on the weekend. This amounts to 5,200 miles per six-month policy period. Driver B rides the bus or bikes to work to decrease gas and parking costs and the hassles of driving and parking downtown. Driver B averages 30 miles total per week, totaling 780 miles per six-month policy period. With traditional time-based insurance, the two drivers pay the same amount per six-month policy period, but Driver A is 6.7 times more likely to have an accident than Driver B. Assuming each driver pays \$300 every six months for car insurance, Driver A is paying six cents per mile of coverage, while Driver B is paying more than 38 cents per mile. Driver A is 6.7 times more likely to have an accident, yet pays 83% less per mile than Driver B. This example clearly illustrates that the current insurance pricing system does not fairly account for risk, and forces Driver B to subsidize Driver A.”
- Wikipedia (2009), “Usage-Based Insurance,” Wikipedia. This article has a bit of a straw man PAYD scheme, imagining strange potential drawbacks. http://en.wikipedia.org/wiki/Usage_based_insurance.
- US House of Representatives 2005 bill #HR4640 (Gerlach), The Future Fuels Act, Section 402. <http://www.govtrack.us/congress/billtext.xpd?bill=h109-4640>.
- In Intelligent Highways Magazine, June/July 2010, Mike Pina of RITA says that US DOT plans to decide by 2013 whether to require auto manufacturers to include IntelliDrive in new production vehicles.

- Science as a Contact Sport: Inside the Battle to Save the Earth's Climate, Stephen Schneider.
http://stephenschneider.stanford.edu/SAACS/saacs_book.htm
- NewScientist Magazine Special Report: Living in Denial, May 2010,
<http://www.newscientist.com/special/living-in-denial>

8E. Perceived pricing / behavior change motivation of various policies:

policy name	perceived gas price increase per gallon	expected VMT change	employer perceived economic impact	commuter perceived economic impact	Applies to	Reference
\$14 per ton carbon allowance	\$0.13	0%	large loss	small loss	All VMT!	extrapolate Hamilton project
\$50/ton carbon allowance	\$0.45	2%	larger loss	medium loss	All VMT!	extrapolate Hamilton project
\$0.05 VMT fee (much more pain than current gas tax)	\$1.00	5%	neutral	medium loss	All VMT!	extrapolate Hamilton project
\$200/ton carbon allowance	\$1.81	9%	huge loss	big loss	All VMT!	extrapolate Hamilton project
Pay per mile, \$1,000/yr ins policy	\$1.67	8%	neutral	neutral	All VMT!	Brookings Hamilton Product PAYD report: http://www.brookings.edu/opinions/2009/02/12_pay_as_you_drive_bordoff.aspx
\$4 cashout	\$3.33	10%	\$880M CA loss	nice gain	commuting only	APA Book: Parking Cashout by Shoup. VTPI has this too
\$2 parking charge + \$4 cashout	\$5.00	23%	in-fill profit	progressive green redistribution	commuting only	\$2 Daily Workplace Parking Charge + \$4 Cashout. http://www.cities21.org/TRB_Paid_Parking2.pdf
Moving Cooler 2050 \$5/gal gas tax increase	\$5.00	28%	huge loss	big loss	All VMT!	Moving Cooler report: http://www.movingcooler.info/

20 mpg is assumed. Sure CAFÉ will increase, but actual mpg isn't very high these days.

Politically, employers perceive the short run negative impact, rather than large long-term benefits

A carbon allowance creates a price per ton of CO2. The Federal Kerry-Lieberman energy bill does not price transportation carbon.