



Appendix-18.5

Road Charge Impact on Rural Residents and Long-Distance Commuters



MEMORANDUM

SUBJECT: Road Charge Impact on Rural Residents and Long-Distance Commuters

TO: Brady Tacdol, Nadiya Chumak, Carrie Pourvahidi, Caltrans

COPY: Matthew Dorfman, Travis Dunn, Jeff Doyle, D'Artagnan

FROM: Shannon Crum, D'Artagnan

DATE: February 16, 2017

1.0 INTRODUCTION

The California Road Charge Pilot Program (RCPP) Technical Advisory Committee's (TAC's) *Road Charge Pilot Design Recommendations Report* includes tax equity as a "parking lot" item. Specifically, the TAC raised the question of geographic equity of a flat-rate per-mile road charge, as seen by rural residents and long-distance commuters. This technical memorandum (memo) identifies key issues related to the distributional effects of a road charge on households in different geographic settings.

Public and political acceptance of any change in tax policy depends on the real and perceived distribution of impacts of the proposed change. Arguments against road charge based on equity are likely to take two forms: (1) distribution of the charges themselves (how the charges impact segments of the population) are unfair, and (2) methods of allocating the revenue (how spending the revenue impacts different segments of the population) are unfair.

This memo specifically addresses two issues that policy-makers may wish to address as part of a road charge implementation in California:

- ▶ Assumption that rural drivers and long-distance commuters will be disadvantaged because they drive farther than their urban counterparts
- ▶ Perception by some elected officials that a distance-based road charge could benefit rural districts because revenue can be distributed back to its county/district of origin (e.g., revenues could be allocated back to the roads where they were generated)

The discussion and examples provided below all assume that any road charge would be a flat-rate, revenue-neutral replacement for existing motor fuel excise taxes, as the TAC specified for the pilot. We refer to this as the *base scenario*. For *enhanced scenarios* of road charging, where these assumptions do not hold (for example, time of day or location-specific rates, congestion management charging, or cordon-based charges), the topics discussed in this memo require additional analysis.

2.0 EQUITY IMPACTS OF ROAD CHARGE ON RURAL RESIDENTS AND LONG-DISTANCE COMMUTERS

The perceived equity issue that a road charge policy creates for rural and long-distance commuters is fundamentally the same: both argue they drive longer distances and are therefore disadvantaged by a distance-based tax. The reasons they drive longer distances may vary: rural drivers cite access to education, food, and medical services, while long-distance commuters cite long distances between jobs and affordable housing. Both groups cite a lack of viable transportation alternatives to driving.

The equity of a distance-based tax has both horizontal and vertical dimensions in the context of geographical distribution of the tax burden. The core of the objection to distance-based fees is horizontal equity—in which people in similar situations (in this case people that drive on public roads) pay similar amounts for the same service. The argument is that those who *must* drive longer distances are not treated similarly to urban drivers, who are able to drive shorter distances to obtain access to employment, goods, and services. However, this objection does not take account of the full context. There are five factors that influence the horizontal equity of road charging, and distance traveled is only one. The factors include the following:

1. Total distance traveled
2. Fuel economy, which is determined by vehicle age and type
3. Household income
4. Accessibility of alternative forms of transport or non-transportation-based work and school options (such as telecommuting)
5. Structure of the road charge and its relationship to policy goals

Previous research suggests that a road charge is, in fact, neutral or beneficial on average to rural residents and that similar income groups would experience similar impacts from moving to a road charge.¹ A 2010 study examining impacts of adopting a vehicle-mile tax for light vehicles in Oregon found that a vehicle miles traveled (VMT) tax is likely to be less regressive overall than the current motor fuel tax, and that rural residents would actually benefit relative to their urban counterparts by experiencing a relative reduction in tax burden.² In 2013, the Oregon Department of Transportation

¹ Weatherford, Brian A. 2012. *Mileage-Based User Fee Winners and Losers: An Analysis of the Distributional Implications of Taxing Vehicle Miles Traveled, With Projections, 2010-2030*. Pardee Rand Graduate School. Ferrell, Christopher E. and David B. Reinke. 2015. *Household Income and Vehicle Fuel Economy in California*. Mineta Transportation Institute.

² B. Starr McMullen, Lei Zhang, Kyle Nakahara. 2010. Distributional impacts of changing from a gasoline tax to a vehicle-mile tax for light vehicles: A case study of Oregon. *Transport Policy*. Volume 17, Issue 6, November 2010, Pages 359–366.

studied urban, rural, and mixed counties in that state, concluding that the financial impacts of a road charge on Oregon drivers would not disproportionately impact rural drivers.³ In 2015, the Washington State Transportation Commission studied the issue and drew similar conclusions for that state: “the tax burden for each group [urban and rural residents] does not appear to significantly change with a switch from fuel tax to a hypothetical road usage charge.”⁴ The Western Road Usage Charge Consortium (RUC West) has commissioned a multi-state study of this issue. The study is underway as of the date of this memo. The detailed discussion below illustrates why this is the case.

Assertion 1: Rural residents and long-distance commuters are inequitably impacted by a distance-based road charge because they drive longer distances

This is by far the most common objection to distance-based road charging voiced by rural residents and long-distance commuters. Several of the five factors that define equity identified above should be considered in analyzing this assertion.

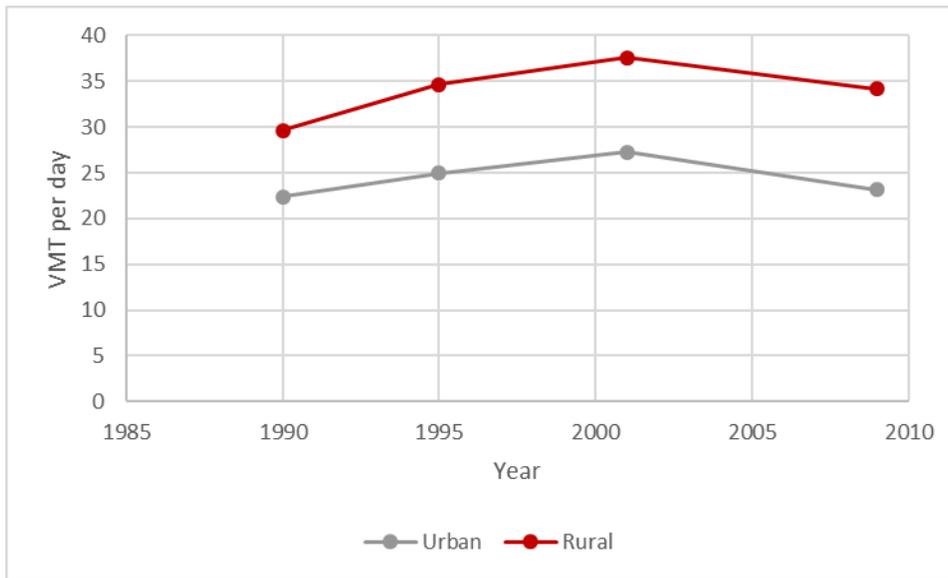
Under a flat-rate road charge, it is true that those who drive more pay more. However, the question of whether a road charge inequitably impacts drivers *compared to the current system* requires consideration of additional factors, notably the fuel economy of the rural passenger fleet compared to the urban fleet, distributional impacts of the current tax system on urban and rural drivers, and the overall policy goals of the road charge itself.

Distance

On average, rural residents of the U.S. do drive more miles per day than urban residents, as shown in Figure 1. However, this is a *national average*, and it should not be assumed this national average applies to any single state. State-specific research outside California suggests that this national finding is not applicable in all states, particularly those with sprawling metropolitan areas that support large numbers of “super-commuters”. It will be important to establish whether rural Californians mirror national averages or display different travel patterns.

³ Whitty, James ed. 2013. *Final Report on Impacts of Road Usage Charges on Rural, Urban, and Mixed Counties*. Oregon Department of Transportation.

⁴ Washington State Transportation Commission. 2015. *Road Usage Charge Assessment: Financial and Equity Implications for Urban and Rural Drivers*.

FIGURE 1. AVERAGE DAILY VEHICLE MILES DRIVEN IN PASSENGER VEHICLES IN THE U.S., 1990-2009⁵

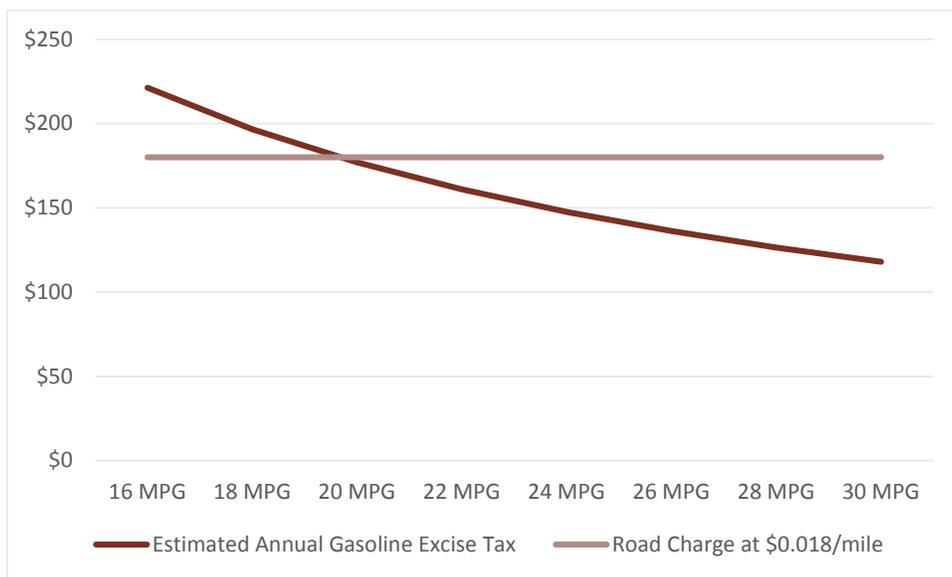
If road charge is assumed as a replacement for motor fuel excise taxes, then rural resident and long-distance commuters are already paying more to fund roads than urban drivers because, presumably, higher vehicle miles of travel (VMT) correlates to more excise tax paid at the pump. This effect is likely compounded by the next equity component: relative fuel economy for urban and rural fleets.

Fuel Economy of Urban and Rural Fleets

An important component of the equity calculation – whether rural drivers are overburdened under a road charge – is the relative fuel economy of urban and rural vehicle fleets. This can be illustrated by considering the point at which the per-mile revenue generated by gas taxes and road charges intersect. In the example below (Figure 2), based on the rates adopted for the RCPP, the two lines intersect at 20 miles per gallon (MPG). Any driver of a vehicle with a fuel efficiency higher than 20 MPG would pay more in a revenue-neutral distance charge (that is a total replacement for the gas tax) than under the current excise tax. Those drivers whose vehicles get less than 20 MPG would pay less than under the current system.

⁵ Source: 2011. A. Santos, N. McGuckin, H.Y. Nakamoto, D. Gray, and S. Liss, Summary of Travel Trends: 2009 National Household Travel Survey. United States Department of Transportation.

FIGURE 2. ESTIMATED COST TO DRIVE 10,000 MILES, GASOLINE EXCISE TAX VS. ROAD CHARGE



Average MPG of vehicles garaged in rural areas is significantly lower than those in urban areas, suggesting that urban drivers would pay more under a distance-based charge. As California progresses in its road charge policy development, a good understanding of the relative fuel efficiencies of urban and rural fleets will be important, not just in the development of an equitable road charge policy, but to assist in rate setting and development of any credit or rebate systems that may be part of the road charge.

Income

Nationally, the median income of rural areas is about four percent less than that of urban areas⁶. Based on this, some argue that a flat-rate distance charge is likely to be vertically inequitable for rural households (i.e., have a disproportionately large impact on lower-income households). However, incomes in rural areas tend to be more tightly clustered around the median, with a smaller percent of rural residents living in poverty than in urban areas (13.3 percent versus 16.0 percent) and a lower GINI index (a measure of the distribution of wealth in which a lower number indicates a tighter distribution). Therefore, it is probable that at the national level the effects of income on geographic equity are less important than those of fuel economy. As with the components of equity identified above, research should be undertaken to determine whether national patterns of income distribution and income inequality hold true in California.

Distributional Impacts of the Current Tax System on Urban and Rural Drivers

Finally, as alluded to above, when considering whether replacing motor fuel excise taxes with distance-based taxes would disproportionately benefit or burden one group over another, it is important to consider the effects of the current system of taxation. Ideally, systems of taxation would be perfectly

⁶ U.S. Census Bureau, 2011-2015 American Community Survey.

equitable while achieving broad policy goals. In reality, this is extraordinarily difficult to achieve. It may be helpful to frame the question of geographic equity in terms of whether it improves under the new system when compared to the old. To answer this question, a full understanding of the distributional impacts of the current tax system should be achieved, and form the baseline for comparisons to impacts of any road charge that might be implemented.

Assertion 2: Rural residents and long-distance commuters may be inequitably impacted by a distance-based road charge because they lack public transportation options

U.S. public transportation infrastructure is concentrated in large urban centers. This is also true in California. However, whether availability of public transportation leads to decreased urban VMT in California is questionable. As shown in Table 1, nationally less than four percent of workers used transit to commute to and from work in 2009, and a majority of that transit use is clustered in the Northeast and Mid-Atlantic regions. The data reveal that although rural residents may be *forced* to drive, urban residents overwhelmingly *choose* to drive. Whether an explicit distance-based fee, particularly one set at a relatively low rate, would induce a shift in mode choice is unknown at this time, and is not the intent of the pilot program enacted by the Legislature in 2014.

TABLE 1. ANNUAL NUMBER (IN MILLIONS) AND PERCENT OF TRANSIT PERSON TRIPS BY TRIP PURPOSE 1990 AND 1995 NATIONAL PASSENGER TRANSPORTATION SURVEYS, AND 2001 AND 2009 NATIONAL HOUSEHOLD TRAVEL SURVEYS

	1990		1995		2001		2009	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
To/From Work	1992	4%	2328	3.60%	2271	3.70%	2247	3.70%
Work-related business	92	2.60%	123	1.30%	213	1.80%	264	2.20%
Family/Personal Errands	1318	1%	2000	1.20%	1776	1.10%	2344	1.40%
School or Church	1076	3.80%	826	2.60%	800	2.10%	829	2.20%
Social and Recreational	946	1.20%	1350	1.50%	989	1%	1426	1.30%
Other	35	1.70%	11	1.90%	134	4.20%	409	5.90%
Total	5460	1.80%	6638	1.80%	6202	1.60%	7520	1.90%

Source: 2011. A. Santos, N. McGuckin, H.Y. Nakamoto, D. Gray, and S. Liss, *Summary of Travel Trends: 2009 National Household Travel Survey*. United States Department of Transportation.

3.0 EQUITY IMPACTS OF REVENUE DISTRIBUTION ON RURAL RESIDENTS

During Phase 1 of the RCPP, several TAC members and stakeholders expressed a belief that distance-based road charges could benefit rural districts if revenue were distributed back to its county/district of origin (e.g., revenues could be allocated back to the roads where they were generated). It is not uncommon that representatives from rural areas voice concern that they receive less transportation funding than urban areas. Some see distance-based road charges as a cure for that. They reason that since rural drivers travel longer distances for goods and services than urban drivers, they must be contributing more to transportation funds than rural areas receive back from the state. There are two primary issues that should be considered here – driver privacy and financial cross-subsidization.

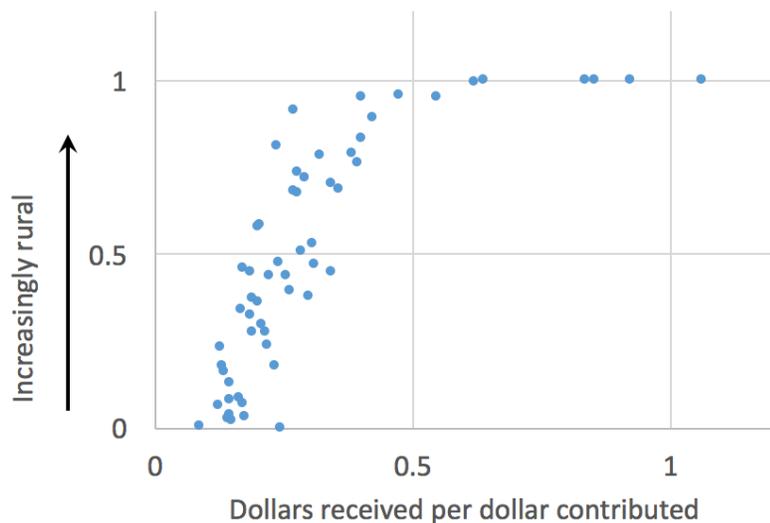
Privacy

Under California's current fuel excise tax distribution formulas, population and number of registered vehicles serve as proxies for actual road usage, with road inventory used as a scaling factor for funding requirements. These data points are anonymized by aggregation to various geographies. In order to allocate revenue directly back to the roads or regions in which they were generated, it is necessary to know fairly precisely how many miles were driven there. This can be estimated rather imprecisely with standard VMT calculations (point traffic counts multiplied by road segment lengths), but many rural roads, particularly very low volume roads, lack up-to-date traffic counts. Another source of information is necessary to establish the actual VMT on rural roads.

To estimate VMT on rural roads, the state could: (1) expand its traffic count program, (2) monitor driver location data within the state and aggregate driving to specific regions or roads, or (3) assume road charges paid by rural residents are the result of miles driven on rural roads near their residences. The first option, while unlikely to generate any privacy concerns, is likely to be prohibitively expensive. The second requires location-aware mileage measurement, which Senate Bill 1077 prohibits. The third option makes assumptions that may not be supported. Regardless of the method selected in order to return distance-based charges back to the road or region of origin, it is necessary to know *where* travel occurred or *who* traveled. It is probable that some portion of the population will express privacy concerns related to both the collection and management of this data.

Subsidization of Rural Roads by Urban Drivers

As a general rule in the U.S., in those states with significant urbanization, and that fund transportation construction and operations at least in part with motor fuel excise taxes, urban drivers subsidize roads in rural areas. In California, this pattern holds, as illustrated in Figure 3, which shows a clear correlation between increasingly rural nature of cities and counties and the amount of funding they receive from fuel taxes. However, since transportation funding sources, distribution formulas, and road charge policies are not widely understood by the public, this is an area where there is likely to be misunderstanding. Many rural drivers and their representatives may assume that under a road charge rural roads would receive more funding, since funds generated on those roads could, in theory, be returned directly to them. Careful analysis and explanation of revenue generation and funding levels will be critical to avoid unrealistic expectations. Further, in the event that formula funding does not change significantly from its present form, it may be necessary to address new complaints from urban drivers who do not currently realize their excise taxes subsidize the rural road network.

FIGURE 3. RATIO OF TRANSPORTATION FUNDING RECEIVED VERSUS FUNDING GENERATED

4.0 CONCLUSION

In other jurisdictions considering or enacting distance-based road charges, rural resident concerns about road charging are unsupported by analysis. Full accounting of the factors that impact equity reveal that rural residents are more likely to benefit under a road charge than under a fuel tax for two reasons: (1) on average, rural drivers currently contribute more in fuel taxes than they would pay under a replacement road charge due to having lower MPG vehicles than urban drivers, and (2) on average, rural residents receive more funding from statewide sources than they contribute in user fees. There is little challenge in demonstrating these facts; there are significant challenges, however, in communicating them to constituents, especially those in rural areas, clearly and convincingly.

Long-distance commuter concerns remain difficult to assess in broad terms. As with rural residents, some long-distance commuters (those with high MPG vehicles) would pay more under a road charge, and some (those with low MPG vehicles) would pay less. However, there are no institutional data available that cover fuel economy of long-distance commuters. However, stakeholder comments during phase 1 of the program raising the concern over long-distance commuters tended to come from suburban and exurban areas such as the Inland Empire region of Riverside and San Bernardino Counties. Residents of these areas tend to share more characteristics of rural areas than urban areas in terms of vehicles driven and road funding received.

The equity issues surrounding rural residents and long-distance commuters require careful consideration if a full-scale statewide road charge policy is implemented. Across the country, some of the objections to road charging stem from misunderstandings about how both motor fuel excise taxes work as well as how distance-based fees might be implemented. Awareness of these issues and

thoughtful analysis by policy makers, as well as clear communication of the real costs and benefits of road charging to the public, will facilitate acceptance.