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Beyond the Gas Tax

Alternatives for a Greener World

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Testimony presented before the Los Angeles Field Hearing of the National Surface Transportation Policy and Revenue Study Commission on February 21, 2007

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Beyond the Gas Tax: Alternatives for a Greener World

**Before the National Surface Transportation Policy and Revenue Study Commission
Los Angeles Field Hearing**

February 21, 2007

Madame Chairman, Commissioners, I'm happy to be here today to testify on these important issues. As we look to the future of transportation finance, two overriding concerns seem likely to determine our agenda. First, there is the challenge of finding the revenue to cover the costs of capital investments, operations and maintenance of the transportation system itself. This has always been the single most important purpose of transportation charges and fees. But, there is a second consideration of growing importance, and that is achieving more efficient, equitable and environmentally sustainable use of the transportation system. In addition to asking whether a given fee or charge is adequate, we must increasingly also ask whether it can also function as a lever to encourage greater efficiency, fairness, and environmental protection than an alternative approach to charging for the use of the system or service.

Decreasing Linkage Between Payments and Use

Direct transportation user fees, such as tolls, fares, and motor fuel taxes, are the preferred ways in which to raise money to support the transportation systems because they align our payments directly with the services for which we are paying. When travelers are presented, through user fees, with the true cost of additional travel, they have a financial incentive to make additional trips only when the private benefit that they receive exceeds the social cost imposed by the travel. This helps to reduce congestion and promotes greater overall efficiency in our collective use of the nation's transportation system. In contrast, charges not related to the use of the system – such as general taxes and fees like income or sales taxes - are regarded as the poorest ways to charge for the use of the system. User fees in the form of gas taxes induce us to buy more fuel efficient cars, while tolls and parking charges encourage us to carpool or use public transit, making these types of charges consistent with our environmental and equity goals. Reliance on income taxes or sales taxes to pay for transportation decouples the users from the payers, by contrast, and also

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provides no encouragement or reward for more desirable behavior. This in turn decreases the overall efficiency of society's use of the transportation system.

Federal and state fuel taxes, though still the greatest source of revenue for transportation, are rising much more slowly than either traffic volumes or transportation system costs. Because fuel taxes are generally levied per gallon, and not per dollar spent on fuel or per mile of driving, inflation and improved fuel efficiency combine to erode the buying power of the motor-fuel tax. To keep pace with rising costs and increasing travel, the per-gallon fuel tax levy needs to be hiked regularly – a significant political liability. Fuel taxes have been increased only a few times since the early 1980s, and have fallen far short of pacing the combined effects of inflation, improved vehicle fuel efficiency, and new program responsibilities.

Governments at all levels in 2004 raised a total of \$129.5 billion in support of highway programs, of which 64% came from user fees, 24% from general taxes, and 12% from specialized or “earmarked” transportation taxes. In that year, all governments in combination raised another \$38.6 billion for transit programs, of which 44% came from user fees, 31% from general taxes, and 25% from specialized transportation taxes. But, over time we are raising less money from user fees and more from instruments not related to system use, such as sales taxes. For example, while motor fuel tax revenues used for highway programs are rising by an average annual rate of 2.4%, revenues from property taxes that were devoted to the support of highways are rising by 4.4% annually. Transportation sales taxes and other specialized taxes devoted to funding highways are rising at an annual rate of 7.5%. For public transit, revenues from fares rose by 3.5% annually over the decade, and those from motor fuel taxes also rose at 3.5% annually, but transit revenue from sales taxes rose by 8.5% annually. This trend – gradually breaking the link between transportation financing and system use – is making the transportation system less efficient, less fair, and less green just as policymakers at all levels are trying to improve the system's performance on those dimensions.

An Alternative Policy Direction: Reemphasizing User Fees

In the short run, a modest increase in federal and state motor fuel taxes would enable revenue to come closer to keeping pace with needs. Despite the obvious political drawbacks of raising these fees, they are much more consistent with our emerging policies of encouraging energy efficiency than increasing reliance on sales taxes or general revenues. Higher motor fuel taxes will simultaneously produce needed revenue and encourage the purchase of more fuel efficient cars such as hybrids. I encourage the commission to support motor fuel tax adjustments in the near future.

Two widely considered strategies for stabilizing user-based revenue growth in the relatively short term involve states or potentially the federal government avoiding periodic political firestorms over raising rates by adopting fuel tax rates that adjust automatically under changing conditions. The first way to accomplish this is through legislation to convert from cents per gallon excise taxes to an ad valorem tax, which means that the tax, like most sales taxes, is set as a percentage of the sale price of the fuel. Over time, the trend in fuel prices is likely to be upward, so a fixed percentage should produce a growing revenue stream. While the political battle to achieve such a change may be vigorous, once won it need not be fought every few years.

The second way to achieve this goal is through legislation indexing the fuel tax to some appropriate indicator, such as the consumer price index, or perhaps more logically, to the construction cost index. These approaches are worthy of careful consideration, but they have some subtle potential drawbacks in addition to obvious benefits. Several states adopted “variable rate” fuel taxes between 1974 and 1982 when the nation was experiencing high rates of increase in fuel prices and we expected rapid reductions in fuel tax revenues due to the adoption of corporate average fuel economy standards. But the fuel prices that had risen so rapidly in the seventies fell quite rapidly in the eighties and fuel tax revenues that were pegged to the price of fuel also produced dramatic reductions in revenues. The case of Michigan is widely cited. After adopting a fuel tax rate directly proportional to a highway maintenance construction cost index and inversely proportional to state fuel consumption, that state allowed indexing to expire in the mid-eighties after experiencing a 36 percent decline in revenue under the new system. About fifteen states enacted some form of indexing in the seventies or early eighties, and most reversed themselves after discovering that the volatility of the price of energy was among the most vigorous sources of inflation. The volatility of the price of petroleum was the fundamental cause of decreasing stability in transportation revenues. In order to dampen potential volatility it is possible to index only a portion of the motor fuel tax and it might be possible to couple indexing with a “cap” upon annual changes in the upward or downward direction in order to avoid wild fluctuations in tax revenue and in prices faced by consumers.

Longer-Term Prospect for Direct User Charges through Electronic Tolls

While some might dismiss reluctance to raise motor fuel taxes as a matter of political will that could change, there are stronger reasons to argue that the motor fuel tax is not a viable revenue base for transportation over the long term. A reduction of 20 percent in average fuel consumption per vehicle mile is possible by 2025 if fuel economy improvement is driven by regulation or sustained fuel price increases or both. The recent introduction of hybrid vehicles provides an

indication of what may well be a long-term transition away from exclusively petroleum-based propulsion.

It is difficult to anticipate with precision the likely market penetration of hybrid, battery electric, biofuels, or hydrogen fuel cell vehicles over the coming decade or more. More important than any particular technology are increasing concerns with global warming and the links between the use of carbon-based fuels of all sorts and the concentration of greenhouse gases in the atmosphere. We should expect a growing national commitment to reducing the production of greenhouse gases, foreshadowed by the California Energy Commission's current program aimed at automobile engines. In addition to state initiatives, it may soon become national policy to reduce the burning of fossil fuels in order to slow growing concentrations of greenhouse gases. Should this happen, basing our system of transportation finance on the sale of carbon-based fuels at both the federal and state levels via the motor fuels tax will be increasingly problematic because it creates for government a deep conflict of interest. If one national policy is aimed at reducing the consumption of fossil fuels while the surface transportation program depends upon growth in the sale of such fuels as a principal source of needed revenue, it creates an undesirable struggle between environmental and revenue policy objectives. It is possible to envision higher transportation energy taxes as a mechanism by which to induce greater vehicle efficiency, but to the extent that such a strategy succeeds in improving efficiency it eventually defeats itself as a revenue source. For this reason it seems useful to plan for alternatives user fees, such as tolls and per mile charges for driving on American highways as successors to motor-fuel taxes.

In stark contrast to the gradual drift away from user fees, recent technology innovations – such as GPS and wireless communications – have stimulated proposals for the introduction of pay as you drive tolling as a long-term replacement for the gas tax. In addition to overcoming the structural and political liabilities of motor fuel taxes, VMT tolling would also breathe new life into the user-fee principle around which transportation finance in the U.S. has traditionally centered. The basic idea behind VMT tolling is to measure the amount of mileage driven by each vehicle in different jurisdictions. Per-mile usage fees would then be assessed, and the resulting revenue would be divided proportionally among the jurisdictions in which travel took place. To measure and record road use, each vehicle must be equipped with an onboard unit integrating a GPS receiver, a set of digital maps with jurisdictional boundaries, an odometer feed, a rate table for computing distance charges, and wireless communication technology for reporting billing data. During each trip, the computer checks the GPS receiver to determine geographic coordinates, then compares this information with digital maps to establish the current jurisdiction. Each mile traveled (based on the odometer feed) is then sorted and stored by jurisdiction, and the computer uses this

information, along with the rate table, to keep a running total of fees owed to different authorities (for example, different states or different counties within states).

Periodically, the recorded road use information is transmitted to a billing agency so that charges can be levied and fees paid. This could occur via dedicated short-range communications when the driver refuels, in which case the fees could be simply added to the fuel bill. Alternatively, data could be uploaded via cellular communications to the billing agency on a periodic basis, and the vehicle owner would then be billed electronically. To prevent toll evasion, the onboard equipment must be tamper-resistant. In one strategy, the onboard units could be programmed to perform regular checks against the odometer to ensure that the metering equipment has not been disabled during any period of operation. Jurisdictions might also choose to mount roadside devices that can communicate with passing cars to verify that onboard units are installed and operational. Automated billing systems to support VMT tolling would likewise need to be secure.

The implementation of VMT tolling would be a major initiative that would require considerable investment. Eventually, all cars would need to be outfitted with the required onboard equipment which would appear to cost on the order of \$100 per vehicle, though the required technology is becoming cheaper with time. In addition, it would also be necessary to implement a range of supporting information technology infrastructure – such as data collection and automated billing systems – that would facilitate the operations of VMT tolling. Capital outlays for implementing VMT tolling at the national level would likely total in the range of tens of billions of dollars. On the other hand, once all of the requisite systems are in place, much of the processing would be automated, and the long term cost-efficiency of operating VMT tolling would likely be high. VMT tolling would also represent a significant evolution in the mechanisms of transportation finance.

In the U.S., detailed feasibility analyses and pilot studies of VMT tolling have been conducted by the University of Iowa, the Oregon Department of Transportation, and the Puget Sound Regional Council. The Oregon Department of Transportation organized a Road User Fee Taskforce and is conducting a pilot study of mileage-based user fees and area-wide congestion tolls, facilitated by on-board units featuring GPS receivers and short wave radio communications. The technology platform was successfully demonstrated in May of 2004, and a pre-pilot test involving 20 vehicles equipped with the onboard metering units was performed in the fall of 2005. The full pilot test, which includes 260 vehicles in the Portland area, was launched in the spring of 2006 and will continue until the spring of 2007. One portion of the study group will pay distance charges only, while the remainder will pay both mileage fees (albeit at a reduced rate) as well as congestion tolls. To compensate for these fees, all participants will receive rebates on their fuel taxes at the time of purchase. Depending on the results of the study, legislation to enact the mileage fee (and

potentially introduce congestion tolls) on a statewide basis may be considered as early as 2009. Several European nations, including Austria, Germany, and Switzerland, have recently implemented automated weight-distance truck tolling programs. Among these, the German TollCollect system utilizes onboard technology similar to that required for general-purpose VMT tolling, thus proving the technical feasibility of the concept

VMT tolling offers the opportunity to charge for every mile driven by every vehicle on every road, and of course the level and type of charging is subject to many political considerations. Depending on the per-mile levy, VMT tolling could be structured as a revenue-neutral replacement for motor fuel taxes, or alternatively the fees could be set to enhance total revenues. For example, the federal gas tax is currently set at 18.4 cents per gallon, while the average fuel economy of the nation's existing passenger vehicle fleet hovers around 22 miles per gallon. Thus, a per-mile fee of around 0.84 cents per mile would generate sufficient revenue to replace the existing federal fuel tax. If a higher per-mile fee were levied, total revenues would obviously be increased. In addition to a flat mileage charge, researchers investigating VMT tolling have also discussed the possibility of incremental per-mile charges for travel during congested periods or for highly polluting vehicles. If instituted, such add-on charges could be used either to augment total revenues or to lower the base per-mile charge without decreasing total revenues. At the same time, by sending price signals that encourage drivers to travel less during peak periods and purchase more environmentally-benign vehicles, these add-on charges could improve the efficiency of our transportation system and reduce the environmental externalities associated with auto and truck travel.

A compelling advantage of VMT tolling is that the revenue stream is not inherently dependent on the fuel economy of the vehicle. In contrast, motor fuel taxes grow weaker with improved fuel economy, necessitating periodic rate hikes that have become increasingly unpopular in recent decades. At the same time, VMT tolling functions effectively regardless of fuel type, whereas current motor fuel taxes are not well-equipped to handle rapidly developing alternatives such as electricity, bio-fuels, or hydrogen. Another benefit of VMT tolling is that the revenue stream is fairly stable, varying only with the number of miles driven by the population. Because the demand for road maintenance and new construction also varies with miles driven, the supply and demand for highway revenues should track one another fairly well.

Many are concerned that the onboard equipment required for VMT tolling would enable the government to track drivers without their consent. Yet when one digs deeper into the details of VMT tolling proposals, it becomes evident that privacy concerns can be addressed through appropriate technical and programmatic design. Researchers have designed ingenious methods

to protect user privacy. In one proposal, drivers would periodically download billing data from the onboard unit onto a smart card, then upload the data to the billing agency via a card reader at a filling station or on a home computer. The transfer process would be divided into two transactions. The first would upload user identification and total amount owed. Then a second, anonymous connection would report the division of the bill to different jurisdictions. The revenues would thus be distributed appropriately, but the government would never know *where* or *when* any individual had traveled, only the total amount owed.

Conclusion

While traditional federal and state motor fuel taxes will undoubtedly produce many billions of dollars in transportation revenues in the years ahead, we are necessarily in the early phases of a transition to a new system or systems of transportation finance. Despite its many virtues, and there are indeed many, all evidence suggests that the fuel tax's days are numbered, though what that number might be remains the subject of considerable debate, and the transition is likely to be gradual.

We face an important societal choice as we consider successors to the motor fuel tax as the basis for long-term changes in transportation finance. If we choose to rely increasingly on sales taxes and general government revenues, we will be able to pay the bills but we will not build into our financing system the equity and sustainability dimensions that, as I have argued, should be of critical importance. By contrast, gradually shifting to greater reliance on newer forms of more refined user charges can make our transportation system more financial sustainable, fairer, and greener while providing for better mobility in the future.

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