



Appendix-18.4

Road Charge Transition Strategies and Issues



SUBJECT: Road Charge Transition Strategies and Issues

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1.0 INTRODUCTION

If California's policymakers decide to implement a road charge, they must confront the question of how and when to transition various groups of California vehicles from the current policy of taxing fuel to a new policy charging for distance driven. Planning the transition of any portion of the vehicle fleet that drive on California's roads to a road charge requires both policy and operational decisions. This memorandum provides a summary of transition-related policy and operational questions to address, and then presents four potential transition approaches.

The policy question boils down to timing: how quickly and how comprehensively do state policymakers wish to transition the statewide fleet to a road charge? A faster, more complete transition may generate more gross revenue in the short term, but maybe more expensive to implement, resulting in less *net* revenue for transportation investment in early years. On the other hand, a slower transition may set up a dual tax system that could be politically challenging to sustain for a long period of time because elected officials and constituents perceive double taxation and are unhappy with paying for the costs of two systems.

2.0 BACKGROUND: WHY IT IS NECESSARY TO EVALUATE TRANSITIONS

Even the most aggressive road charge policy requires a transition period to be implemented. Much of this transition occurs before the first vehicle is enrolled. Policymakers and implementing agencies must educate the motoring public of the new policy, its features, and compliance requirements. They must develop and implement regulations, set up information technology and data exchange systems (including a linkage with the vehicle registry at the Department of Motor Vehicles (DMV)), procure technology (e.g., hardware and software for the state agency overseeing road charge) and services (e.g., account management and enforcement), integrate financial and accounting systems across multiple agencies, and rigorous systems testing.

The fastest, most complete transition policy would be to mandate all registered vehicles in California begin paying road charge by a certain date, allowing sufficient time for designated agencies to

implement the system and ready it for launch. It is technically possible to enroll over 30 million vehicles into a road charge program in a short period of time, at least 12 months, although not without cost or challenges. Challenges include deploying a large capacity for customer service and IT for a brief enrollment period and the added risk of high-profile glitches or outages, which could impact revenue. The State can address these challenges by adding resources to handle large initial volumes of enrollments.

An alternative to the complete transition approach, is basing transition from fuel tax to a road charge on specific vehicle characteristics. These include vehicle age, vehicle fuel economy, vehicle weight, and/or combinations of these three. Figure 1 is an illustration of the age of the California fleet and shows the distribution of light-duty vehicles through 2015 based on DMV data.

FIGURE 1. CALIFORNIA LIGHT-DUTY VEHICLE DISTRIBUTION BY AGE

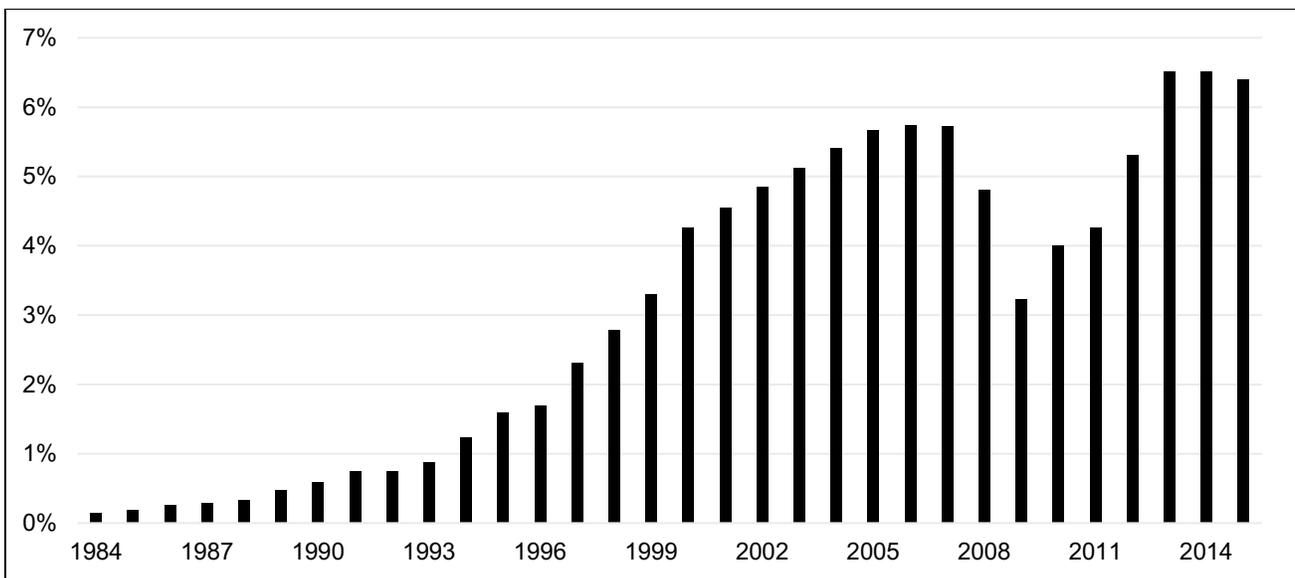
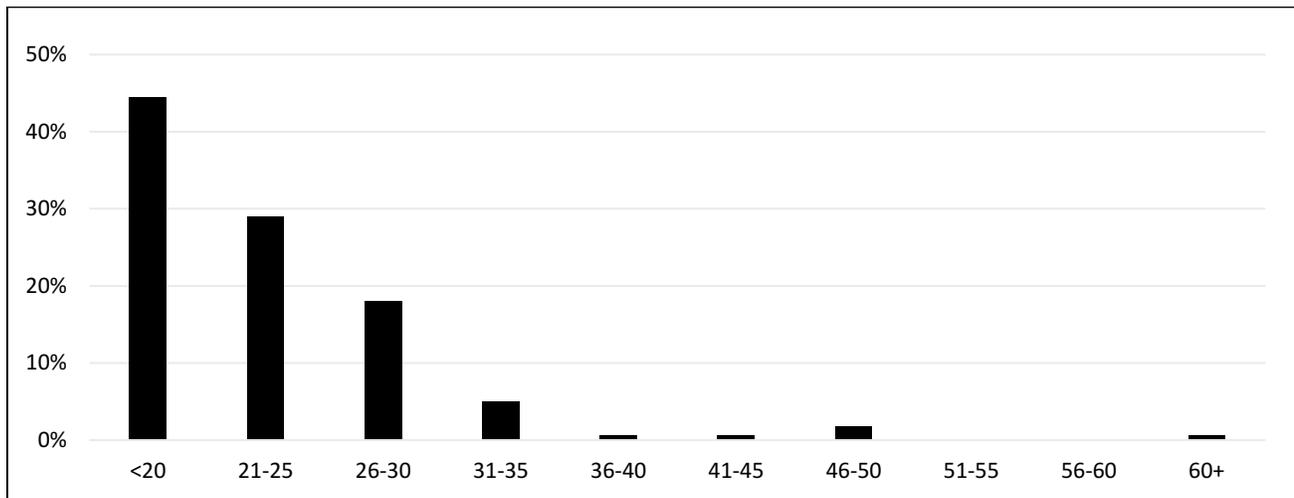


Figure 2 is an illustration of fuel economy of the California fleet as of early 2016 and shows the distribution of light-duty vehicles based on DMV data.

FIGURE 2: CALIFORNIA LIGHT-DUTY VEHICLE DISTRIBUTION BY FUEL ECONOMY

In summary, when formulating a transition strategy for road charge, policymakers must define which vehicles are subject to the charge, when they are subject to it, and whether and how fuel tax credits or refunds apply to those vehicles. The next two sections present major policy and operational issues that must be addressed in formulating a transition strategy for road charging.

3.0 TRANSITION-RELATED POLICY ISSUES

This section covers key policy issues impacted by the method of transition. As policymakers contemplate road charge legislation, their decision of how to transition the fleet may be impacted chiefly by these issues: double taxation, out-of-state drivers, enforcement, and cost.

3.1 Double Taxation

Perhaps the most important policy issue to address in a transition strategy is double taxation. According to Senate Bill (SB) 1077, road charge represents a replacement for fuel taxes, not an additional tax. In practice, this means that no vehicle should pay both fuel tax and road charge for the same miles driven. The Road Charge Technical Advisory Committee (TAC) reiterated this policy parameter frequently in public deliberations and the California State Transportation Agency (CalSTA) memorialized it in the design of the Road Charge Pilot Program (RCPP) by testing credits for fuel taxes paid in the pilot and including them on participants' mock road charge invoices.

As long as fuel taxes are collected at the rack and passed on to retail fueling stations to collect it from end consumers, the possibility of double taxation – real or perceived – exists. As mentioned above, policymakers must decide whether and how vehicles subject to the road charge should be eligible for fuel tax credits or refunds.

- ▶ A fuel tax credit can be applied toward road charges owed. For example, if a vehicle owes \$15 in road charge, only \$15 of fuel tax credits can be utilized, regardless of the amount of fuel tax paid.

- ▶ A fuel tax refund could result in motorists receiving cash back from the government. Extending the above example, if the same vehicle was measured or estimated to have paid \$20 in fuel taxes, they would be eligible for a \$5 refund.

While the fuel tax is charged at the pump, some combination of credits and refunds will almost certainly be needed to prevent the possibility of double taxation.

3.2 Out-of-state Drivers

With the DMV vehicle registry, it is possible to enforce road charge mileage reporting and payment on in-state, California-registered vehicles. However, it is more challenging to devise a transition strategy to road charge for out-of-state vehicles driving on California's roads, because detection of short-term occasional visitors, a necessary component of enforcement, would be very costly to implement.

As discussed in the Road Charge Jurisdictional Issues policy paper, the most expedient short-term policy is to continue collecting fuel tax on out-of-state vehicles. In the near term, given the relatively low proportion of cross border vehicle trips, the complexity of implementing road charge programs for all California drivers, and low administrative costs for collecting the fuel tax, keeping the current practice of fuel taxation for out-of-state drivers could be advantageous. However, once road charging is established and operational for the majority of California drivers, it is likely that some decision-makers may wish to extend road charge to out-of-state drivers, perhaps motivated by the desire to finally eliminate the fuel tax. Thus, two questions remain: (1) Unlike the fuel tax, should there be an exchange of road charge revenue between jurisdictions? (2) *When* should the State require some or all out-of-state drivers to comply with a road charge?

Several legal and policy considerations impact the ultimate decisions regarding out-of-state drivers. First, there are constitutional prohibitions on discriminatory treatment of residents vs. non-residents (namely, the Commerce Clause of the U.S. Constitution). The State may need to make road charging products (mileage reporting methods) equally available to non-residents, even if the policy aim in the short term is not to transition out-of-state vehicles. Secondly, policymakers will need to consider the status of other states' road charge efforts. As other states impose road charge on their resident vehicles, the opportunity and ease of transitioning the road charge program to include out-of-state vehicles improves.

3.3 Enforcement Mechanisms

Enforcement will be an important aspect of any successful road charge system. Without it, even well-meaning residents who intend to comply with reporting requirements may prove negligent. Enforcement becomes even more important during a transition, when only a subset of vehicles may be subject to road charge. Policymakers must provide clear statutory guidance to agencies for identifying subject vehicles, penalizing non-compliant subject vehicles (e.g., via civil fines), and giving administrative tools (and funding) to enforcement agencies to follow through. Based on consultations with DMV, a potential administrative tool for policymakers to include, is a registration hold for vehicles that incur a sufficient number of penalties for typical road charge reasons (e.g., for not being registered with an account

manager or having overdue unpaid road charges). Creating a registration hold enables law enforcement officers (both local and state) to become involved. This measure should be reserved for long-term, serious violations. Having law enforcement officers involved for such serious offenses is vital to ensure compliance, and creating a registration hold is the simplest way to get law enforcement involved, from a policy perspective.

3.4 Cost of Implementation and Collection

Transitioning to any new system is costly, but the costs of a new road charge system will vary depending on the speed and nature of the transition. Policymakers must identify funding for the implementation of a road charge, which will vary based on transition approach.

- ▶ In general, faster transitions are costlier for several reasons.
 - > First, faster transitions require rapid, large-scale system and software implementations by agencies and private sector providers (whether Commercial Account Managers (CAMs), or contracted vendors).
 - > Secondly, the costs of mileage-based revenue collection today are substantially greater than the cost of fuel tax collection. As technology and business models evolve, the industry marketplace will be able to provide road charge collection services at a fraction of present-day costs, both due to technological advances and economies of scale. Thus, establishing a large quantity of accounts early may come at a higher cost than waiting for technology and business models to evolve to a less costly state.
 - > Finally, a revenue-neutral road charge policy, which was implemented for the RCPP, would typically result in some vehicles below the average fuel economy receiving fuel tax credits or refunds. Because more vehicles would have fuel efficiencies below that average fuel economy at the start of a mandatory program, the cost of administering credits and refunds would be higher under a fast transition.
- ▶ On the other hand, slower transitions create other categories of costs.
 - > A slower transition to road charge necessarily requires keeping the state fuel tax collection and administration infrastructure in place at least until road charge covers most or all vehicles.¹ Although a relatively small cost, this nonetheless is an additional cost to consider in a longer-term transition scenario.
 - > It is conceivable that a very slow transition could delay the evolution of the technology and services market for road charge collection and administration. For the state to capitalize on the cost savings of CAMs, there must be sufficient market volume for CAMs to justify lowering their costs.

¹ Federal fuel taxes would continue to be collected by the Internal Revenue Service of the U.S. government and not directly affected by California's road charge transition strategy.

As policy makers contemplate the pace and nature of transition, they will need to weigh the cost implications, including the factors outlined above.

3.5 2017 California Transportation Revenue Package

In April 2017, the California Legislature enacted a package of transportation funding changes including one-time increases in the state gasoline and diesel excise taxes, indexing of the fuel excise taxes, and several vehicle-related fees. These new revenue tools change the policy context for road charge transition strategies, including in particular the following:

- ▶ *Rates.* The revenue neutral rate between fuel excise taxes and the RCPP demonstrated mileage rate has changed. With a higher per-gallon gasoline excise tax, the corresponding revenue-neutral road charge rate will be higher than the 1.8 cents per mile used in the RCPP.
- ▶ *Transition timing.* The need to transition vehicles from fuel tax to road charge may not have the same level of urgency as it did prior to passage of the revenue package. With the fuel tax rate adjustment and future indexing to inflation, at least part of the transportation revenue challenge has been addressed. However, the underlying dilemma of improvements in vehicle fuel economy undermining fuel tax revenue remains. Passage of the revenue package allows the state an opportunity to thoughtfully consider the possibility of transitioning from a gas tax to a road charge.

4.0 TRANSITION-RELATED OPERATIONAL ISSUES

As policymakers consider legislation and weigh transition alternatives for road charge, each policy choice will have a corresponding operational tradeoff. Agencies must anticipate the software, organizational, and procedural systems necessary to carry out the preferred policy for transitioning the vehicle fleet. Below are three key operational issues impacted by the desired transition approach.

4.1 Fuel Tax Refunds or Credits

Depending on the policy direction, agencies/departments implementing road charge must be prepared to administer fuel tax refunds and/or credits. As the RCPP demonstrated, there are several methods for calculating or estimating fuel tax paid by vehicles subject to road charge. These methods will evolve over time. Presently, they include direct measurement of fuel consumption from onboard computers (currently via plug-in devices, but in the future via in-vehicle telematics) and estimated fuel consumption based on fuel economy ratings provided by the U.S. Environmental Protection Agency (EPA).

- ▶ Direct measurement of fuel consumption from the onboard diagnostic (OBD-II) port is the most accurate way to calculate fuel tax refunds or credits. However, it is not a universally available solution. Many older vehicles (including those manufactured prior to 1996) do not have an OBD-II port, while some vehicles (such as some plug-in hybrid electric vehicles) report data in a non-standard way. Even among vehicles that conform to OBD-II reporting standards, as many as one third report fuel consumption in a way that cannot be used to calculate fuel consumption.

- ▶ Estimated fuel consumption based on EPA ratings of fuel economy can be done for any vehicle with an EPA rating, using the combined city/highway miles per gallon (MPG). However, the fuel economy of any individual vehicle will vary from its rating depending on a range of factors, including perhaps most importantly the proportion of city and highway driving.

The OBD-II port enhancements mandated in 2016 by the Air Resources Board² will standardize the method of measuring and reporting fuel consumed, allowing for more widespread availability of simple, reliable, accurate fuel tax calculations beginning with vehicles produced in Model Year 2019. With fuel levels also reported, GPS-enabled devices may also be able to indicate the state in which fuel is purchased, providing further precision to the fuel tax credits and refunds.

Regardless of the direction of automotive technology, agencies must be prepared to handle fuel tax refunds or credits in a transition period. A fast transition, for example, may subject older vehicles to road charge, thus increasing reliance on EPA ratings for estimating fuel tax credits or refunds and, as experienced in the RCPP, increasing the number of questions, complaints, and challenges from motorists about how their credit is computed since individual results vary. A slower transition may allow agencies to incorporate new vehicle technologies to improve reliability and reduce complaints and challenges.

4.2 Determination of Road Charge Subject Vehicles

As stated above, regardless of the transition approach, road charge legislation will identify vehicles in statute that are subject to road charge and at which point in time. Implementing agencies must be able to identify vehicles according to the statutorily defined indicators. For example, if statute calls for a transition based on Model Year alone, then DMV must reliably identify road charge subject vehicles based on Model Year data in the vehicle registry. More complex transitions based on other factors such as fuel type, weight, or fuel economy may require more complex processing of data in the motor vehicle registry to identify subject vehicles. Identification of subject vehicles is not a one-time process. The road charge system must maintain its connection to the vehicle registry to continuously update the registry of road charge-subject vehicles, including working with enforcement entities to properly enforce mileage reporting and payment.

4.3 Revenue Accounting

While the transition approach for road charge may vary, there will be multiple agencies involved in collecting and recording transportation revenue. In addition, there is likely to be a credit or refund policy

² California Air Resources Board, Clean Version of Latest Office of Administrative Law-approved version of OBD-II regulations, Approved July 25, 2016, available at:

https://www.arb.ca.gov/msprog/obdprog/section1968_2_clean2016.pdf

to avoid double taxation. The agencies involved in collecting road charge and fuel tax must resolve revenue accounting and reporting issues before implementing any transition.

Road charge net revenue will include a subtraction of fuel tax credits and/or refunds. The accounting issue is how to report those various transactions. Should the implementing agency/department, for example, report only the net (gross minus credits minus refunds) as road charge revenue? Or should the implementing agency/department report the gross as road charge revenues, leaving the credits and/or refunds as adjustments to apply to fuel tax revenues reported by the California Department of Tax and Fee Administration? These issues are important for providing an accurate picture of the revenue policy performance to decision makers. They are even more important if road charge and fuel tax revenues have distinct uses. The transition of the vehicle fleet will impact the magnitude of this issue.

4.4 Advances in Vehicle Technology

Vehicle technologies are rapidly evolving with the advent of inexpensive sensors, onboard computers, vehicle-to-vehicle communications, and vehicle-to-infrastructure communications. The RCPP featured a successful proof of concept for vehicles to report mileage driven from the vehicle directly to a back office without any additional onboard equipment using in-vehicle telematics. However, limitations of telematics include inability to report location data and limited availability from only a subset of new vehicle makes and models. By contrast, OBD-II mileage reporting remains widespread and feature-rich, but has limitations of its own, such as no ability to recover mileage driven when devices are unplugged and limited ability to measure fuel consumption.

Operational possibilities may impact the preferred transition strategy. Transitioning in the early 2020s, for example, may allow for incorporation of OBD-II changes into the operational design of the road charge program. A later transition would likely allow for even greater availability of telematics mileage reporting. As California policymakers formulate a transition strategy, periodic updates on the technology implications may be warranted.

5.0 ASSESSMENT OF TRANSITION ALTERNATIVES

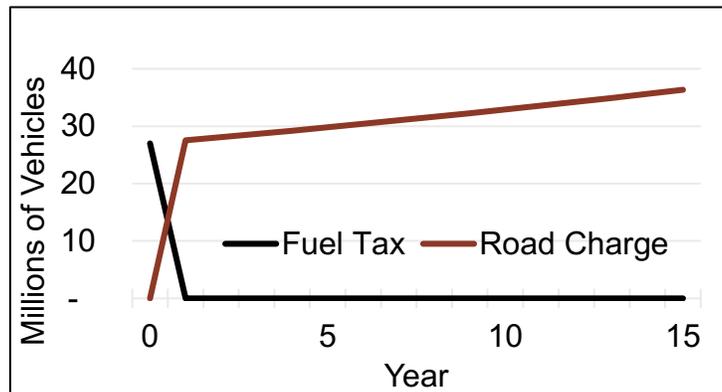
This section summarizes four illustrative transition alternatives in decreasing order of transition time.

- ▶ The first, big bang, assumes a rapid transition of all vehicles from fuel tax to road charge over a period of no less than one year.
- ▶ The second, transition by age, assumes a gradual transition of the fleet by subjecting only new vehicles from a certain Model Year onward to road charge, leaving the rest on fuel taxes.
- ▶ The third, transition by fuel economy, assumes an even slower, more gradual transition of the fleet by subjecting only new vehicles from a certain Model year onward above a specified fuel economy to road charge, leaving the rest on fuel taxes.
- ▶ The fourth, transition by weight, contemplates transitioning vehicles by weight, starting with those vehicles over 26,000 pounds.

There are other approaches to transition, but the fundamental variable is the dimension along which vehicle conversion is defined, which impacts the pace of transition. These examples consider age, fuel economy, and weight as the possible dimensions, but there could also be hybrid approaches. In addition, under any transition scenario, vehicles not initially included (e.g., vehicles older than the initial Model Year cutoff) could be switched from fuel tax to road charge at some time in the future.

5.1 Big Bang Transition

Under the big bang approach to transitioning vehicles to road charge, California would subject all vehicles (or all light-duty vehicles, which are those under 10,000 pounds) to road charge over a very brief period, such as one year. With over 30 million vehicles, this transition would require enrollment, onboarding, and mileage reporting for all California vehicles. After the big bang transition year, the state could begin dismantling the infrastructure for collection of state fuel taxes (or at least state gasoline taxes, were policymakers to maintain diesel taxes as the principal source of revenue from heavy vehicles).



This bold approach to transition has its merits.

- ▶ Avoid perception of double taxation. By transitioning the fleet at once and ceasing the collection of fuel tax, policymakers could avoid any ambiguity about double taxation for road repairs and maintenance. To capitalize on this benefit, they would likely need to dismantle fuel tax collections quickly as well.
- ▶ Achieve gross revenue sustainability quickly. As the fundamental motivator of road charge policy analysis and exploration, charging per mile is a more sustainable source of transportation revenue than taxing per gallon. By transitioning the entire fleet at once, California could establish an unambiguous path toward revenue sustainability quickly. Simultaneously, policymakers could further pursue policies of adopting vehicles with higher fuel economies (including zero emission vehicles) without fear of unintended consequences for transportation revenue.
- ▶ Reduce confusion and enhance fairness. Based on research conducted for the RCPP in 2015, one of the most compelling public acceptance factors for road charge is the concept of fairness, defined as “paying for what you use.” By transitioning the fleet at once, policymakers declare unambiguously to their constituents that everyone will be treated the same for road revenue policy.
- ▶ Incur political “pain” in a single episode. There will be risks and opposition to road charging regardless of the pace of transition. A fast transition, if politically viable, can effectively

overcome the “pain” of road charge policy implementation in a single debate rather than a protracted transition.

This fastest of all transitions also has disadvantages.

- ▶ Large upfront costs. The Legislature would need to provide a large upfront allocation of funds to achieve a Big Bang transition to cover the costs of agency system setup including staff, equipment, and software; third-party vendor (including potentially CAMs) recruitment, regulations, procurement, testing, integration, and ongoing compensation; enforcement; and other upfront costs. Should policymakers endorse the notion of user choice, the total upfront cost expected would not be known until California’s millions of motorists make their decisions about how to report miles traveled, adding uncertainty to an already large cost.
- ▶ High risk of system failure and revenue loss. As with any sudden large-scale policy or administrative change, a big bang transition to road charge has many risks. Even if the political risks can be overcome and the policy mandated for implementation, there remain substantial technical and implementation risks that ultimately are revenue risks. Even minor technical glitches can have major consequences due to the number of people joining the system each day. These risks can be mitigated, but doing so is costly. One low-cost mitigation technique is to leave the fuel tax in place for a brief period after the big bang is complete, until road charge is sufficiently established that it represents minimal revenue risk. However, the overarching risk is that a technical failure undermines political and public confidence in the policy, which could lead to a backlash and loss of appetite for road charge.
- ▶ Dismantling fuel tax removes low-cost enforcement, including for out-of-state drivers. One of the benefits of transitioning quickly is to dismantle the fuel tax and avoid the criticism that road charge represents double taxation. However, doing so removes an important and cost-effective revenue tool that serves as a strong measure against evasion and as a means of collecting road revenue from out-of-state drivers during a road charge transition period. Without the fuel tax, policymakers would need to ensure confidence and effectiveness in enforcement of road charge from the outset by investing more in it. They would likewise need to devise a solution for out-of-state drivers, in order to capture revenue for their use of roads. Without fuel tax, this could be any number of road charge mileage reporting methods. Implementation of out-of-state road charging at the outset could prove even more challenging than implementation of road charge for in-state vehicles, especially for visitors from states without a comparable road charge program. According to a recent study by the Western Road Usage Charge Consortium, miles traveled in California by out-of-state vehicles likely represents between 1% and 3% of total miles traveled, meaning the costs of a road charge system that includes out-of-state vehicles likely outweighs the benefits.³
- ▶ High profile policy affecting all Californians. Public acceptance of road charging prior to education and outreach efforts is low and unlikely to improve dramatically in the near term.

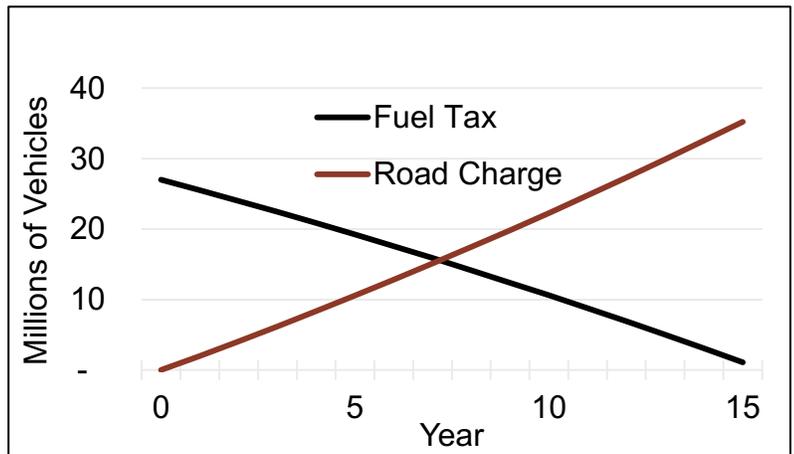
³Appendix A-3: Road Charge Jurisdictional Issues Policy Paper

A high-profile, fast transition affecting every registered vehicle in the state may create more political blowback and public outcry on an already delicate subject matter, especially with the passage of Senate Bill 1 (Beall, 2017). Constituents are more likely to object to road charging when they are subject to paying the road charge, and they may object for a wide variety of reasons, both personal and philosophical. They may cite the transition approach and its inherent risks as a reason for opposition, or feel like the increase in fuel taxes solved the funding problem and road charge is not necessary.

The “Big Bang” approach is a high-risk, high-reward transition policy. Policymakers would rely on agencies to implement road charge quickly and smoothly to achieve the rewards and mitigate the risks. A successful implementation could reduce the level of effort and rancor over transportation funding as a policy topic, while setting up the state with a sustainable revenue architecture to achieve its transportation policy goals. However, a failure or misstep could set back road charging as a concept for a decade or more.

5.2 Transition by Age

As the chart in Section 2 illustrates, new vehicles have accounted for between 6-7% of all vehicles in California each year since 2013. This equates to about two million vehicles per year, a trend that is expected to continue at least in the near term, notwithstanding economic downturns such as the period 2009-2012, which saw historically low rates of new vehicle purchases due to low consumer confidence, credit crunch, unemployment, and other economic factors. Transitioning new vehicles into road charge, and leaving old vehicles on the existing fuel tax system, brings several advantages over the more aggressive “big bang” approach.



- ▶ The slower transition requires a more modest upfront investment. The number of vehicles that the road charge system would handle in year one is an order of magnitude smaller than the big bang approach (approximately two million, compared to 30 million). The corresponding complexity and administrative ability to implement this system is similarly improved, thus reducing risks of technical failure, political backlash, public outcry, and cost overruns. Over time, as new vehicles continue to enroll into the road charge system, the system grows increasingly able to absorb new vehicles at lower costs. In the later years, the technology and business evolution of road charge service providers such as CAMs represents further cost reduction opportunities. Meanwhile, the size of the market and commitment to market growth (approximately two million vehicles per year) is substantial

enough to entice CAMs to market with more aggressive pricing and more innovative delivery of services, for the benefit of road charge payers and administrators alike.

- ▶ New vehicles tend to have better fuel economy than older vehicles. Based on data from DMV, the average EPA rating of Model Year 2015 vehicles in California is about 29 MPG, an increase of 45% over 2004 vehicles, which are around 20 MPG. The purpose of road charge is to stem revenue erosion caused by vehicles with higher fuel economy. Transitioning first with new vehicles addresses that problem more directly than applying road charge to all vehicles, which would include many older and less fuel-efficient vehicles.
- ▶ Identifying subject vehicles through the DMV registry based on Model Year is straightforward. In addition to collecting Model Year directly upon registration, DMV also collects Vehicle Identification Number (VIN), which can be decoded to verify a vehicle's Model Year. Moreover, DMV's registration process for new vehicles purchased at dealers is done through their business partner program, which results in high quality registry data with few errors or omissions.
- ▶ Reduce or eliminate opposition from automakers. Automotive manufacturers have signaled support or at least tolerance of a "new vehicle" transition approach. This is a constituency whose views on road charging matter to elected officials at the state and national levels.

There are some disadvantages to transitioning only new vehicles.

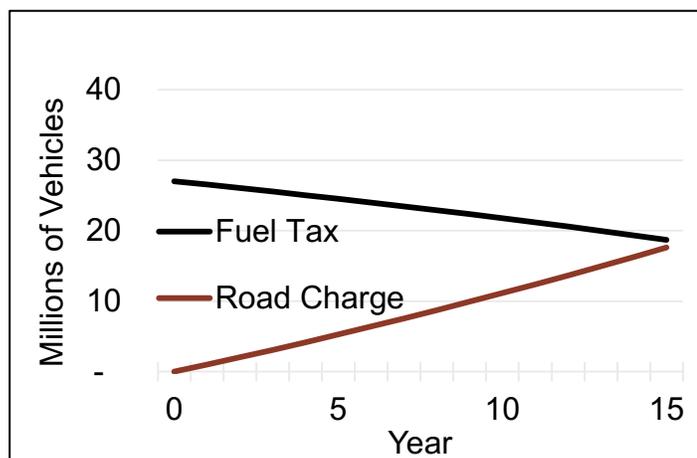
- ▶ Large-scale transition. Although an order of magnitude smaller than big bang approach, the new vehicle transition approach is nonetheless a large-scale transition, with approximately two million vehicles to absorb in the first year. No road charge program exists at that scale anywhere in the world, forcing state agencies to confront technical implementation challenges at an unprecedented scale.
- ▶ Dual tax systems in place. As with any approach herein, new vehicle transition requires the state fuel tax to remain in place, potentially for decades. In addition to the added costs of collecting both a road charge and a fuel tax, public skepticism around having two systems in parallel could undermine this approach.
- ▶ Accounting of fuel tax and road charge. Among the issues raised in Section 4 is the notion of properly accounting for fuel taxes, road charge, and fuel tax credits or refunds. That issue must be addressed under a new vehicle transition scenario.
- ▶ Potential objections from auto dealers. Although automakers may not object to a new vehicle transition, it is conceivable that auto dealers could object, arguing that a road charge mandate could depress sales of new vehicles.

The new vehicle transition is an elegant approach that combines the best of road charge policy (addressing revenue erosion from vehicles with relatively higher fuel economy), market encouragement (adding sufficient vehicles to foster a CAM market to reduce costs and improve overall program operations), political support, and administrative simplicity (straightforward, unambiguous definition of subject vehicles in the DMV registry). It does have some drawbacks, namely the political and

administrative challenge of sustaining two fee collection systems in fuel tax and road charge for an extended period.

5.3 Transition by Fuel Economy

Another approach that is may be even more gradual than the new vehicle approach is to transition vehicles based on their fuel economy. The Oregon Legislature attempted and failed to enact this approach for a road charge mandate in 2013 due primarily to opposition from automakers who viewed the approach as counterproductive to their efforts to encourage adoption of vehicles with high fuel economy. As Oregon's policymakers



formulated their road charge program, the merits and drawbacks of this transition approach played out vividly through committee and floor debates. Among the merits were the following factors.

- ▶ Transitioning vehicles above a certain fuel economy addresses head-on the stated problem that road charge purports to resolve. This gives elected officials the internal policy consistency they often desire, at least within the topic of transportation revenue.
- ▶ Depending on the precise cutoff point, this transition approach allows for a much smaller number of vehicles to enter the program in the early years, thus moderating the “new vehicle” transition approach, which itself is fairly large and risky. For example, if only plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs) are included in the mandatory program, then the program would need to absorb approximately 100,000 vehicles in its first year, an order of magnitude smaller than the “new vehicle” transition. This scale allows the system to work out bugs and other inefficiencies, control costs, and more fully assess revenue risk before expanding to include a larger set of vehicles. By starting at the high end of the fuel economy spectrum, there is no risk to revenue, since PHEVs, EVs, and other vehicles with very high fuel economy consume little to no fuel and currently pay little to no fuel tax.

There are political and administrative challenges to transitioning via fuel economy.

- ▶ Challenges in identifying subject vehicles. DMV and the RCA may encounter challenges in identifying subject vehicles if the policy specifies fuel type or specific MPG cut-offs in statute. The reason is that the definitions of vehicles by fuel type constantly evolve and are not consistently reported by automakers, not consistently encoded in VINs, and may not be understood by the vehicle owners who may be asked to self-report their liability for the charge. Likewise, although EPA's MPG ratings are a straightforward external source for setting cut-offs, identifying the precise MPG rating of a single vehicle cannot be automated

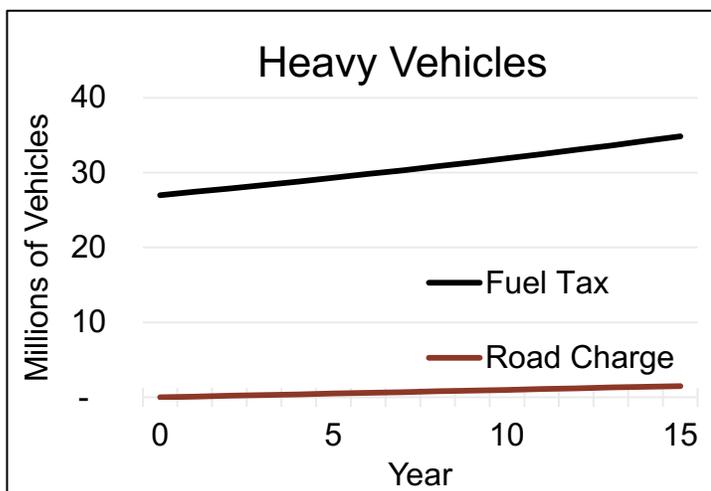
based on VIN number 100% of the time. There are many “edge cases,” where automakers produce numerous variations on a model, each with its own, different EPA rating. These variations are not always encoded in VINs, which makes matching for purposes of determining vehicle eligibility a challenge. In these cases, the state can ask vehicle owners to self-report their exact vehicle type, which leaves open the possibility of accidental mis-reporting and intentional fraud; or the state can require all owners of such vehicles to have them checked at a DMV or smog check facility, which itself would be costly and logistically complex.

- ▶ Political challenge of “targeting” high MPG vehicles. In Oregon in 2013, automakers persistently opposed the notion of a transition based on fuel economy. There are no indications that such opposition has waned. Elected officials in California will likewise be sensitive to this category of objections, since road charge only for a particular class of high fuel economy vehicles could be seen as counterproductive to energy, air quality, and other environmental policy goals.

Transitioning the vehicle fleet to road charge based on fuel economy has substantial policy merit given its internal consistency and relatively low-cost, low-risk administration. Revenue generation depends on the MPG cutoff selected. A very high cutoff (e.g., only alternative fuel vehicles) would generate little net revenue relative to a lower MPG cutoff. This approach also has administrative challenges and political opponents.

5.4 Transition by Weight

The RCPP introduced a new policy option that was not contemplated by SB 1077, but is available to policymakers: transitioning by weight, starting with heavy vehicles. Administratively, this may be the most appealing option, but it introduces policy and political challenges for road charge more generally. Below are the advantages of starting the transition to road charge with heavy vehicles:



- ▶ Industry familiarity with mileage reporting and regulations. The trucking sector is already heavily regulated. That alone is not a compelling argument for adding road charge. However, truck fleets must already comply with a number of reporting requirements. Fleets with trucks over 26,000 pounds that travel across state borders must report miles driven and gallons purchased by jurisdiction for purposes of the International Fuel Tax Agreement (IFTA) and International Registration Plan (IRP). For these fleets, reporting miles for road

charge purposes does not represent a substantial additional burden for compliance. In some respects, it could even simplify their compliance burden.

- ▶ Agency simplicity to manage. On the side of the implementing agency, starting with heavy vehicles would result in fewer “accounts” to manage relative to light-duty vehicles. BOE currently oversees approximately 20,000 accounts representing over 80,000 trucks for IFTA in California. The smaller number of accounts results in a relatively smaller cost to administer for trucks relative to light-duty vehicles. In addition, the revenue per account is higher due to the multiple trucks per account and larger number of miles driven, resulting in a more favorable “cost to collect as a percent of revenue,” a common metric for revenue collection efficiency.
- ▶ Increasing automation for commercial vehicles. Even before the federal mandate for electronic logging devices (ELDs) for monitoring hours of service, which goes into effect in late 2017, the trucking sector was already adopting automated services for fleet tracking and logistics. The RCPP experience demonstrated one commercial account manager alternative, EROAD, and its suitability not only for road charge but also for providing a host of other commercial services such as driver safety, fleet management, fuel management, and other compliance products (e.g., driver logs, IFTA reporting). EROAD and similar firms will drive adoption of telematics due to the value of their services irrespective of whether a road charge is in place. This presents an advantage to road charging given that the state could collect revenue from service providers like EROAD at no cost, as is done in Oregon for that state’s weight-mile tax.

Despite the administrative and cost advantages of transitioning first with heavy vehicles, there are drawbacks.

- ▶ Failure to address fundamental revenue fuel tax revenue dilemma. The Energy Information Administration projects that heavy truck fuel economy will improve over the next several decades, and there is even potential for advances in engine technology that lead to a proliferation of alternative fuel trucks. However, these advances and the corresponding impact on fuel tax revenues are further away than the problem of light-duty fuel economy and its near-term impact on fuel tax revenues. Thus, beginning with trucks does not directly confront the problem of declining fuel tax revenue.
- ▶ Opposition from industry. Despite the well-established IFTA and IRP systems, technological advances in truck telematics, and softening by some state and national industry bodies (such as the California Trucking Association), the commercial trucking industry remains opposed to distance-based charging for trucks. That opposition could wane as pilots such as the RCPP demonstrate the effectiveness of road charging for heavy vehicles, but at present, starting the transition with trucks could lead to a political battle that, again, distracts from the underlying problem of fuel tax revenues.
- ▶ Experience may not be transferrable to light vehicles. As the RCPP illustrated, the technology and systems for collecting road charge from heavy vehicles differs substantially

from light vehicles. First, the charge payers would be companies, not people. They operate equipment for commercial purposes and would treat road charge payment as a mandatory business activity. Second, acceptable technology to support automated mileage reporting in commercial vehicles differs in important ways from acceptable technology for light-duty vehicles for security, accuracy, and technology cost. Thus, on the charge payer side, little about the heavy vehicle experience would be transferrable to light vehicles. This implies that starting with heavy vehicles would not be a meaningful exercise for growing public understanding and acceptance of road charging among the majority of motorists.

There are several compelling reasons to begin with heavy vehicles, chiefly the administrative simplicity and revenue opportunity. Under a heavy vehicle charging scheme with rates set for cost recovery (i.e., per-mile rate set to cover damage done to the roadway), there could also be cost equity reasons to support starting with heavy vehicles. But, without straying into the political merits of simplifying weight fees and diesel taxes into a single distance- and weight-based charge, starting with heavy vehicles does not address the chief road charge policy concern of sustainable revenue, nor does it provide a strong platform for improving the administrative or political prospects of road charging for light-duty vehicles.

5.5 Summary of Alternative Strategies

The table below summarizes the advantages and disadvantages each alternative strategy.

Transition Strategy	Advantages	Disadvantages
Big bang	<ul style="list-style-type: none"> • No policy ambiguity regarding dual tax system • Remove state fuel tax collection system, save cost • Preserve and even enhance the fairness of road revenue system (“user pays”) 	<ul style="list-style-type: none"> • High cost of setting up transition • High risk, including risk of state revenue source • Potential to require retrofitting of large numbers of vehicles with older, more costly reporting methods
Transition by age	<ul style="list-style-type: none"> • Captures new vehicles with higher likelihood of new, less costly reporting methods • Captures new vehicles with higher fuel economy which directly addresses fuel tax decline dilemma 	<ul style="list-style-type: none"> • Requires a dual tax system for a transition period • Potential opposition from auto dealers • Still a relatively high initial investment and large revenue risk, albeit smaller than the big bang alternative
Transition by fuel economy	<ul style="list-style-type: none"> • Captures vehicles with highest fuel economy which 	<ul style="list-style-type: none"> • Potential technical challenges and “edge

Transition Strategy	Advantages	Disadvantages
	directly addresses fuel tax decline dilemma <ul style="list-style-type: none"> Depending on cut-off point, potentially modest improvements to revenue sustainability 	cases” in implementing the MPG cut-off <ul style="list-style-type: none"> Potential objections from high MPG vehicle owners, automakers, and advocates
Transition by weight	<ul style="list-style-type: none"> Industry familiarity with regulation, including mileage and tax reporting for other purposes Agency familiarity with mileage-based tax collection from heavy trucks Growing industry familiarity with automation and electronic reporting methods 	<ul style="list-style-type: none"> Does not directly address most imminent fuel tax revenue dilemma caused by light vehicle fleet MPG improvements Experience with road charge for heavy vehicles not entirely transferrable to light vehicles Industry opposition

6.0 CONCLUSIONS

Policymakers have a range of transition policy alternatives available. Short of the “big bang” approach of transitioning all vehicles at once, they can address segments of the fleet based on vehicle age, fuel economy, weight, or combinations of these. Each possible transition approach has policy and administrative benefits and drawbacks, as well as political consequences.

A successful transition should address the following policy issues effectively:

- ▶ Avoid double taxation
- ▶ Address out-of-state vehicles in a legal and appropriate manner
- ▶ Include appropriate enforcement mechanisms
- ▶ Feature adequate funding for road charge administration based on a realistic assessment of the costs associated with the chosen transition approach

In addition, a successful transition should provide for the following administrative features:

- ▶ A workable, efficient system for fair, reliable, and consistent implementation and credits or refunds for fuel taxes
- ▶ An approach for reliably identifying road charge subject vehicles and enrolling them for road charge mileage reporting, payment, and enforcement
- ▶ A system of accounting and financial recognition and reconciliation that properly segregates and reports fuel taxes, road charges, and any fuel tax credits

Ultimately, political factors will prevail in determining the type of transition to road charge that is acceptable to a majority of elected officials and the general public. They may choose to emphasize or de-emphasize the policy merits of the chosen transition strategy, based on what emerges as a politically acceptable consensus. Regardless of what emerges, agency officials must be prepared to address the operational implications of the chosen transition strategy.