

Value Driven

How pricing can encourage alternatives to driving alone and limit the costs that driving imposes on others



This report is a component of the SPUR Regional Strategy, a vision for the future of the San Francisco Bay Area

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Executive Summary

What does “getting ready to go” look like for most people? It often means gathering a wallet, bag, phone and, last but not least, car keys. For many people, and for many trips, getting somewhere means driving. Driving is the default option because it is most often easier and cheaper than carpooling, transit, biking or any other alternative. This is especially true during the COVID-19 pandemic, in which many have opted to stop sharing space with others on transit or in shared rides.

The ease of driving has much to do with the fact that the Bay Area was built after the personal car became widespread in the mid-20th century. The vast array of streets, roads and parking lots, as well as the distance between neighborhoods and job centers, have accommodated and prioritized the personal car over transit, biking and walking.

This car-oriented landscape effectively subsidizes car travel over other modes. For example, roads and parking are expensive to build, but they are mostly free for drivers to use as much as they’d like, whenever they choose. While this kind of free access lets people work, play, run errands and more, each individual’s driving imposes serious costs on others. These costs come in the form of traffic and lost time, climate pollution and its resulting fires, floods and heat, and local air pollution and the heart and lung disease it brings, especially for the young, the elderly, people with low incomes and people of color. In other words, giving cars free priority means travel takes longer, our climate is less stable and the most vulnerable among us are sick more often.

City planners and policymakers have tried to address the negative impacts of car travel by either building more roads (to solve traffic) or by building infrastructure for more bikes, trains or buses (to encourage people to take these modes). And yet, traffic has not been solved and people still drive alone most of the time. An over-reliance on driving alone is not likely to change until driving is no longer the cheaper, faster or more convenient option. To help level the playing field between driving and other modes, drivers need to face the true costs of their trips. That is, the price of driving needs to reflect the costs it imposes on others.

Existing policies that have explicitly charged drivers more have mostly sought to solve congestion. For example, congestion charges in London and Stockholm make it more expensive to drive into their crowded central business districts. These policies have successfully discouraged car trips and improved air quality, lowered climate pollution and decreased travel times for buses and cars.¹

While these benefits are also needed in the Bay Area, discussions of using pricing to solve the region’s transportation challenges bring up concerns about equity. In an already expensive region in which so many struggle to get by, would pricing be fair?

Answering this question requires looking at how pricing would financially affect different drivers, as well as a serious look at the fairness of the status quo. The truth is, our excessive reliance on driving alone creates inequities. Children growing up near freeways, who tend to be Black, Latinx or low-income, often have poor lung function for life due to emissions exposure.² People with low incomes pay disproportionately more of the sales taxes that help fund roads, even though some of them can’t afford a car or drive less than those with higher incomes. Households with low incomes are more likely to overlap with areas prone to flooding from climate

¹ Seattle Department of Transportation, 2019, Seattle Congestion Pricing Study, page 9, http://www.seattle.gov/Documents/Departments/SDOT/About/SeattleCongestionPricingStudy_SummaryReport_20190520.pdf#page=24

² The University of Southern California Children’s Health Study. Findings summarized by the California Air Resources Board and last updated in July 2015, <https://ww3.arb.ca.gov/research/chs/chs.htm> (accessed on November 13, 2018).

change,³ which is fueled by everyone's driving. Less driving would help lessen these inequities. In terms of affordability, pricing policies would need to identify and subsidize drivers with lower incomes.

As part of the SPUR Regional Strategy, this report helps envision a more equitable, sustainable and prosperous future for the Bay Area and recommends policies needed to get there. It complements other regional strategy reports that outline the roles of the public and private sectors in delivering alternatives to driving alone.⁴ This report takes the position that over the next several decades, we as a society need to rethink what it is we pay for directly and what we expect for free. It imagines a future where the many indirect costs of driving are diminished and the streets are quieter, safer and filled with more pedestrians, bikes, transit and carpools. A future where climate change has been kept at bay and where the air is clean for all. In this future, people pay each time they drive and are rewarded with lower prices and incentives when they don't. In addition, the way people pay for transportation would be different. With a single platform where travelers can pay for tolls, parking, transit, shared scooters and more, they'll be able to more clearly see the cost of driving versus other modes, receive rewards and ultimately buy trips instead of cars.

The strategies and policies that will help bring this vision to fruition are listed below. Strategy 1 begins with how to address process equity — the degree to which different communities are included in policy decisions and design — as well as affordability. For the policies listed in Strategies 2 and 3 — parking and congestion charges respectively — there is some overlap in terms of the outcomes they may produce. For example, a package of parking policies and charges alongside incentives (Strategy 2) could help solve congestion (Strategy 3) in many places. On the other hand, all of these policies in Strategies 2 and 3 could work together to target different trips made by different people. Ultimately, policymakers will need to define measurable outcomes for the policies in Strategies 2 and 3 — for example, how uncongested specific areas should be — and track progress and adapt pricing policies to meet goals. Strategy 4 would replace the state gas tax with a road user charge. This would more fairly charge people for the driving they do, as well as create a more sustainable way to fund California's transportation infrastructure. Strategy 5 highlights a novel way that pricing could help reach the region's clean air goals. It also recommends a way policymakers could create a payment platform that could operate across all modes, scale incentives for not driving alone, help govern subsidies for drivers with low incomes and reduce the costs of administering key pricing policies.

³ NYU Furman Center, "Population in the U.S. Floodplains. Data Brief," 2017, pages 4-5, https://furmancenter.org/files/Floodplain_PopulationBrief_12DEC2017.pdf

⁴ SPUR, *The Future of Transportation*, 2020, <https://www.spur.org/publications/spur-report/2020-08-11/future-transportation>

Strategies and Recommendations to Create a Future that Values People Over Cars

STRATEGY 1

Prioritize Equity in Policy Design and Outcomes

RECOMMENDATIONS

1. Dedicate staffing to ongoing equity outreach and other processes
2. Establish means-based subsidies or discounts for new pricing policies

STRATEGY 2

Encourage Alternatives to Driving Alone Through Pay-to-Park Charges, Incentives and Limiting the Oversupply of Parking

RECOMMENDATIONS

3. Prohibit monthly parking passes
4. Establish a regional transportation demand management (TDM) program
5. Require Bay Area employers to charge a daily minimum for the parking they provide
6. Limit parking supply through regulations and pricing
7. Price public parking to achieve minimum levels of availability most of the time

STRATEGY 3

Manage Congestion Through Parking Rates, Downtown Charges and Tolls

RECOMMENDATIONS

8. Establish discounts for off-peak parking
9. Implement congestion pricing in downtown San Francisco
10. Improve enforcement of occupancy and other rules in managed lanes
11. Adjust bridge tolls to manage congestion
12. Create strategies for all-lane tolling on critically congested highways with transit alternatives

STRATEGY 4

Establish Pay-As-You-Go Road User Charges

RECOMMENDATIONS

13. Pass statewide legislation to further study, pilot and phase in road user charges to replace the state gas tax

STRATEGY 5

Pioneer New Pricing Policies and an Interoperable Payment Platform

RECOMMENDATIONS

14. Link Spare the Air days to regional pricing policies
15. Create an interoperable payment platform that travelers can use across all modes

Introduction

Our Current Transportation Prices Value Cars Over People

Everyone has somewhere to go — a job, school, a friend or family member to see, a doctor’s appointment, an errand to run. How do they get there? In the Bay Area, most people drive, and most often alone. For many, getting to places and driving a car are synonymous and assumed. The streets and parking lots that stretch between homes, businesses and shopping centers reflect this. The COVID-19 pandemic has also reinforced driving alone as people distance themselves from others and seek control against invisible pathogens.

But driving alone is not the only option for getting around, and in fact, it is one that leaves us with long-lasting inequities and costs that we have accepted as thoroughly as our reliance on driving itself. In bustling economic times, Bay Area congestion was some of the worst in the US,⁵ meaning more people sat in inching traffic instead of exercising, going on dates, tucking in their kids at night, getting work done or taking up a new hobby. The Bay Area also suffers from poor air quality that causes heart and lung disease,⁶ due in large part to automobiles.⁷ Passenger cars are the single largest source of climate pollution.⁸ Far too many are injured or die in auto collisions.⁹ These are just some of the hidden costs of driving paid by both drivers and non-drivers alike. Many of these costs fall disproportionately on communities of color, the young and elderly, low-income communities and people with disabilities.

Figure 1 lists the direct costs that drivers pay, as well as the costs that driving imposes on everyone, drivers and non-drivers alike. The out-of-pocket driving costs are intuitive to anyone who has ever owned a car. The costs everyone pays, however, are often viewed by individual drivers as something *other* people cause. But all drivers contribute to these costs. For example, the more cars there are on the roads and the more they all drive, the higher the likelihood of collisions, injury and fatalities. The more tail pipe emissions there are from gasoline-powered cars, the worse local air quality is and the higher the rates are for hospitalizations from heart and lung disease, particularly within communities living near freeways. These are just two examples of the many serious costs brought on by a collective reliance on driving alone.

5 D. Schrank, B. Eisel and T. Lomax, “Urban Mobility Report,” Texas A&M Transportation Institute 2019, <https://mobility.tamu.edu/umr/>

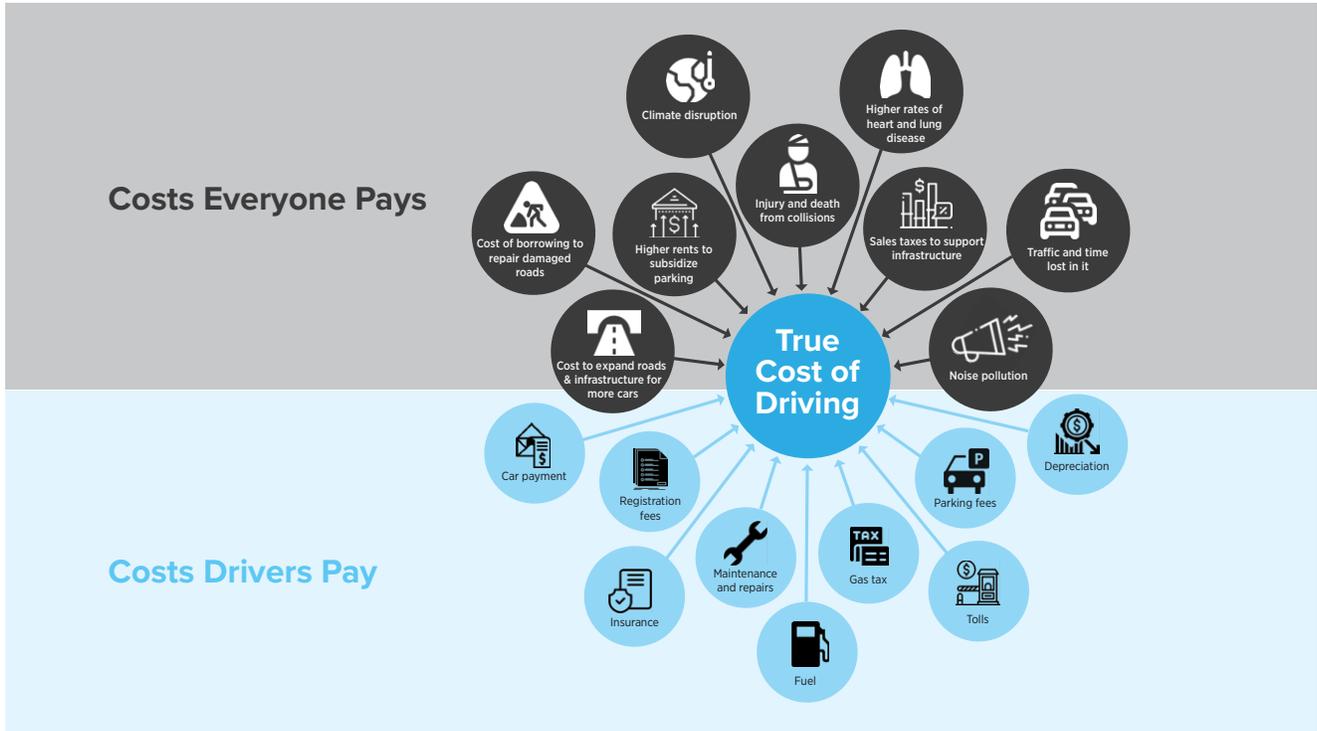
6 American Lung Association, State of the air 2018, <https://www.stateoftheair.org/city-rankings/most-polluted-cities.html> (accessed on July 10, 2020).

7 Union of Concerned Scientists, 2019, “Inequitable Exposure to Air Pollution from Vehicles in California,” <https://www.ucsusa.org/sites/default/files/attach/2019/02/cv-air-pollution-CA-web.pdf>

8 SPUR, *Fossil Free Bay Area*, 2016, page 9, <https://www.spur.org/publications/spur-report/2016-09-21/fossil-free-bay-area>

9 Metropolitan Transportation Commission’s Vital Signs, “Fatalities from Crashes,” <https://www.vitalsigns.mtc.ca.gov/fatalities-crashes> (accessed on May 13, 2019).

FIGURE 1
Today’s Reliance on Driving Alone
Carries Hidden Costs, Often
Imposed on Those Who Don’t Drive



Across the US and in the Bay Area, planners and policymakers have tried many strategies to help address the hidden costs of driving. They’ve spent billions of dollars to widen and build new roads to decrease congestion, only for the new space to encourage more driving and fill with traffic again. Public agencies have also built new transit centers and new bike lanes to attract people away from cars. And while such transit and bike investments are critical to increasing the alternatives to driving alone, they too are not enough. People still cause traffic, and most still drive alone. The problem is, these solutions have not accounted for the relative cheapness and ease of driving. To actually reduce the number of trips in which people drive alone, it has to be cheaper, faster or more convenient to take other modes. This is something pricing is uniquely suited to do: It levels the playing field with other modes by asking people to pay directly for costs their driving imposes on others. It also provides revenue to invest in alternatives to driving alone.

Numerous efforts are under way in major metro areas to do just that. They largely put a direct price on driving and subsidize transit. These include long-standing congestion charges in Singapore, London, Stockholm, Milan and Gothenburg and newer efforts in New York, Los Angeles, San Francisco and Seattle. These programs generally work by designating a congested downtown area and charging drivers to enter or travel within it. Programs in Singapore and Europe have succeeded in reducing traffic, emissions and noise in busy downtowns while giving people more options to get around without driving alone.¹⁰

This report considers what it would be like to implement such policies in congested downtowns like San Francisco’s, as well as a broader set of pricing strategies across a wider geography and over the next

10 See note 1.

several decades. It includes policies that are suitable along commercial corridors, across bridges and across the Bay Area's largely lower-density landscape. As part of SPUR's Regional Strategy, a vision and set of recommendations for the Bay Area over the next 50 years, it also looks past the status quo. It imagines replacing the hidden costs of driving with direct prices on driving alone. In some cases, travelers may not pay more, but would pay *differently*. For example, this report proposes replacing the gas tax with a per-mile road user charge that would be a fairer and more sustainable way to fund transportation. In the end, this report paints a vision for the next several decades of a Bay Area in which a new way of pricing nudges drivers into trips that cost others much less.

Creating a new set of pricing policies will take work. Political opposition to pricing has been strong, as there has been a multigenerational investment in the personal car and a reluctance to pay for something that has always *felt* free. In addition, many question whether or not pricing is equitable, especially in an expensive area where so many are already struggling to meet basic needs. This concern is important and has often halted pricing policies. However, saying that pricing would be inequitable assumes that the status quo is already equitable, which is fundamentally untrue in the important ways listed below.¹¹ Pricing can help shift the driving behavior that leads to some of these inequities, and can also offer a new revenue source to further correct them. In addition, pricing policies must be carefully crafted and co-created to advance equity instead of further eroding it. Policymakers will also need to find ways to identify and subsidize low-income drivers to directly address affordability.

The inequities created by our excessive reliance on driving alone:

Our reliance on cars leaves fewer affordable housing options. Laws that require us to set aside scarce urban space to move and park cars force us to give up space for more critical uses, such as housing. Cities that require an oversupply of parking also make existing housing more expensive, taking away housing options for low- and middle-income earners.

Our reliance on cars is paid for in poorer health, often by the most vulnerable, and often for life. Neighborhoods that absorb highways and queues of cars are often the only places where people with lower incomes, people of color and people with disabilities can afford to live. A child who grows up in the air pollution of such areas is more likely to experience lung disease and miss school as a result.¹² Research that followed children's lung development in California points out that these health damages last for life.¹³ In addition, the emissions and noise from traffic may lead to hypertension and poorer mental health.¹⁴

Historically marginalized communities lack adequate access to basic amenities. Options to get to high quality jobs, schools, fresh food, open space and more are often severely limited in communities with low incomes.¹⁵ These also tend to be predominantly Black and Latinx neighborhoods as well as where the elderly and people with different abilities can afford to live. The United States' chosen public

11 Michael Manville often makes this point. For example, see Michael Manville and Emily Goldman, "Would Congestion Pricing Harm the Poor? Do Free Roads Help the Poor?" *Journal of Planning Education and Research*, volume 38, issue 3, 2018, pages 329-344.

12 Frank Gilliland et al., "The Effects of Ambient Air Pollution on School Absenteeism Due to Respiratory Illnesses," 2001, <https://journals.lww.com/epidem/pages/articleviewer.aspx?year=2001&issue=01000&article=00009&type=fulltext>

13 See note 2.

14 S. Stansfeld and M. Matheson, "Noise pollution: non-auditory effects on health," *British Medical Bulletin*, Volume 68, Issue 1, December 2003, Pages 243-257, <https://academic.oup.com/bmb/article/68/1/243/421340>

15 Don Gordon, UCLA Newsroom, "Access to parks, open spaces in your community can be a health factor," <https://newsroom.ucla.edu/stories/public-health-experts-find-poor-neighborhoods-lack-access-to-parks-open-space> (accessed on August 2, 2020).

investment in the car means that those who cannot afford or operate one often have to forgo all kinds of opportunities and amenities.

Current transportation funding is regressive. Local governments provide the majority of transportation funding,¹⁶ mostly through local sales taxes. Gas tax revenue makes up the majority of the funding that flows through federal and state programs. Both sales taxes and gas taxes are regressive, meaning that households with lower incomes spend a larger share of their income on them.¹⁷

Wealthier people often drive and use roads more. The vast majority of households in the US have at least one vehicle. But 78% of those without a car are in the lowest income bracket.¹⁸ Through sales taxes, very low-income households end up paying for roads they use far less than wealthier travelers.

Hours wasted in traffic affect low-income people too. Economists often assume that people with lower incomes would not benefit from the time savings associated with congestion charges in the form of tolls, area pricing or parking prices. This is not always true. For example, it ignores the fact that lower-income shift workers face higher consequences for being late to work than higher-income salaried employees. A little over half of the lowest-income workers drive alone to work, and people who take the bus are more often low-income. Both groups would benefit from more free-flowing roadways. In addition, any prices can be tiered by income or revenues redistributed in a way that furthers equity.

Climate change will continue to disproportionately affect already vulnerable populations, and passenger cars are the single largest source of climate emissions. California cannot meet its ambitious climate goals on a meaningful timeframe with cleaner vehicle technology alone. As a society, we will also have to drive less. Meeting our climate goals and helping to avert climate change will mitigate heat, health and natural disaster risk for our most vulnerable.

To both solve our transportation challenges and advance equity, we need to fundamentally change our collective thinking about what we should explicitly pay for and what we should be able to access for free. This report outlines a broad vision for how to do just that.

¹⁶ California's Transportation: An LAO Primer, 2018, <https://lao.ca.gov/Publications/Report/3860#Funding>

¹⁷ The 2017-18 Budget Funding Package, LAO, 2017, page 6, <https://lao.ca.gov/reports/2017/3572/Trans-funding-021717.pdf>

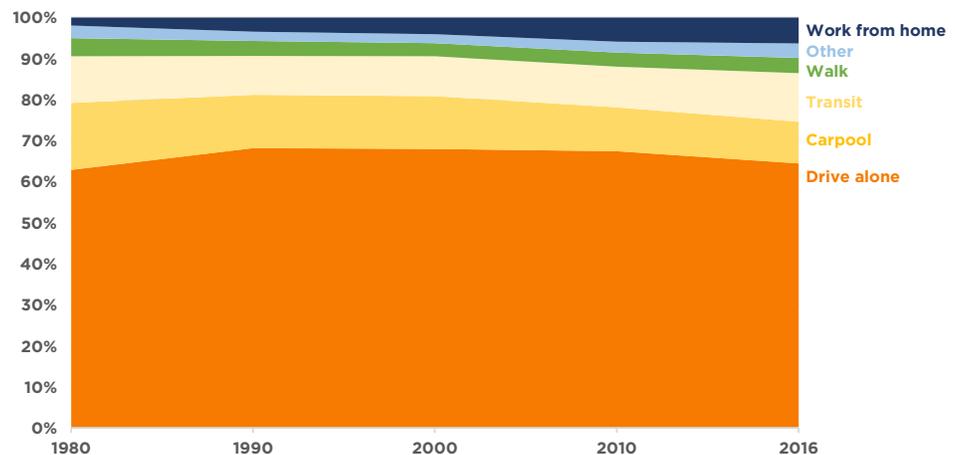
¹⁸ Memmott, "Trends in Personal Income and Passenger Vehicle Miles," US Department of Transportation, Research and Innovative Technology Administration, 2007, https://www.bts.gov/archive/publications/special_reports_and_issue_briefs/special_report/2007_10_03/entire

Chapter 1

The Costs We Shouldn't Accept

For at least four decades, more than two-thirds of commuters have gotten to work by driving alone. While commuting may make up roughly a third of trips in the Bay Area,¹⁹ it's likely that other trips fall into a similar pattern. Across the region and country, COVID-19 has also pushed ardent transit riders and carpoolers to drive alone. The current reliance on driving alone leaves our region with two big problems. First, it means deep and wide-ranging social costs like pollution and wasted time in traffic. Second, the way we ask drivers to pay for the infrastructure to support their driving doesn't cover it.

FIGURE 2
For Nearly 40 Years, Two-Thirds of Bay Area Commuters Have Driven Alone to Work
Percentage of commute trips in the nine-county Bay Area taken by each mode
 Between 1980 and 2016, the percentage of people who drive alone to work has hovered around 66% and the rate for those who take transit has held at about 11%. Meanwhile, the carpool rate has dropped from 16% to 10%, and the work from home rate has risen from 2% to 6%.



The High Costs of Driving Alone

Despite how easy it is to drive alone, it is not without many costly consequences.

First, travel throughout the region has come to cost people more and more of their time and productivity, as seen in Figure 3. At its peak, congestion cost the average San Franciscan more than \$2,000 every year in lost work time.²⁰ During the first months of shelter-in-place orders and the economic fallout of the COVID-19 pandemic, congestion evaporated. However, congestion is on the rise again as people resume travel but are still concerned about transmission of the SARS-CoV-2 virus that causes COVID-19. Many call for additional roads or road widenings to accommodate more cars, but such efforts have failed to deliver people from traffic. Researchers have found that for a 10% increase in road capacity, there is a 10% increase in driving.²¹ The added

¹⁹ Some survey data from San Francisco indicates that commute trips make up roughly a third of all trips. See: San Francisco Municipal Transportation Agency (SFMTA), "Travel Decisions Survey 2017: Summary Report," page 10, https://www.sfmta.com/sites/default/files/reports/2017/Travel%20Decisions%20Survey%20Summary%20Report%202017_Accessible.pdf. The author assumes about a third considering that some trips to "home" include trips directly from work to home.

²⁰ INRIX's estimates of the cost of congestion, <http://inrix.com/press-releases/scorecard-2017> (accessed on May 10, 2017).

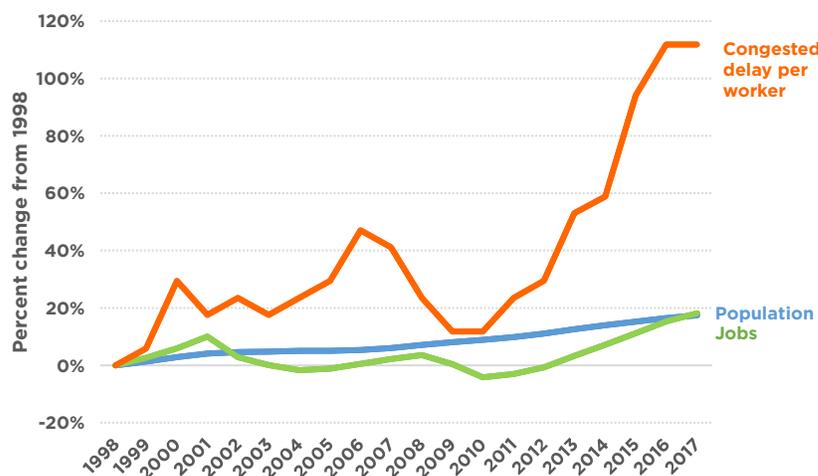
²¹ Duranton and Turner, "The Fundamental Law of Road Congestion: Evidence from US cities," *American Economic Review*, American Economic Association, vol. 101(6), pages 2616-52, October 2011, <https://www.nber.org/papers/w15376>

lanes and roads simply encourage more driving. This has been seen in the widening of the 405 in Los Angeles, which cost more than \$1 billion²² and resulted in slightly *slower* speeds, and the widening of Houston’s Katy freeway to 23 lanes, which cost \$2.8 billion and also resulted in slower travel times for many drivers.²³

In addition, passenger vehicles threaten people’s lives. With more drivers on the road, the potential for injury and death among drivers, passengers, pedestrians, cyclists and bus riders goes up. Cars are also a major source of local air pollution, which contributes to lung and respiratory disease.²⁴ Local air degradation and its health impacts concentrate in low-income communities and communities of color, exacerbating long-standing racial and economic inequities that erode the quality of life in the region.

FIGURE 3
All-time Highs in Congestion
May Spike Higher With
COVID-19

Percent change in jobs, population and congested delay per worker since 1998. While population and jobs in the nine-county Bay Area have risen by 17% and 18%, respectively, since 1998, the congested delay per worker has risen by 112%. Our transportation system cannot accommodate more solo commuters without costing everyone time.²⁵ The trend line mirrors (and exaggerates) jobs lost in the Great Recession (2007–2010) and the climb in jobs during the economic recovery (2010–2017).



California’s initiative in tackling climate change is an example for leaders around the world.²⁶ Still, the global climate crisis has the potential to wreak havoc on the natural systems that underpin our health and economy. From drought to wildfires, and from sea level rise to intense heat waves, the climate crisis is already here and will only get worse without even more leadership and effort.²⁷ Passenger cars are the single largest source of climate pollution in our region and state. Without tackling carbon emissions from cars, California will not be able to meet its ambitious 2030 statewide climate targets, and we will not be doing our part to chart a course toward climate stability.²⁸

22 LA Metro and Caltrans, I-405 Sepulveda Pass Improvements Project Monthly Status Report, October 2012, http://media.metro.net/projects_studies/pm/images/pm_october_2013_i405_sepulveda_pass_improvements2.pdf

23 G. Weissman and M. Casale, “Highway Boondoggles 5: Big Projects. Bigger Price Tags. Limited Benefits.”

24 SPUR, *Fossil Free Bay Area*, pages 5 and 7.

25 Congested delay per worker is measured in the number of vehicles on the road, multiplied by the time they spend traveling at speeds below 35 miles per hour, divided by the total number of workers. See MTC Vital Signs, <http://www.vitalsigns.mtc.ca.gov/time-spent-congestion> (accessed on April, 15, 2018).

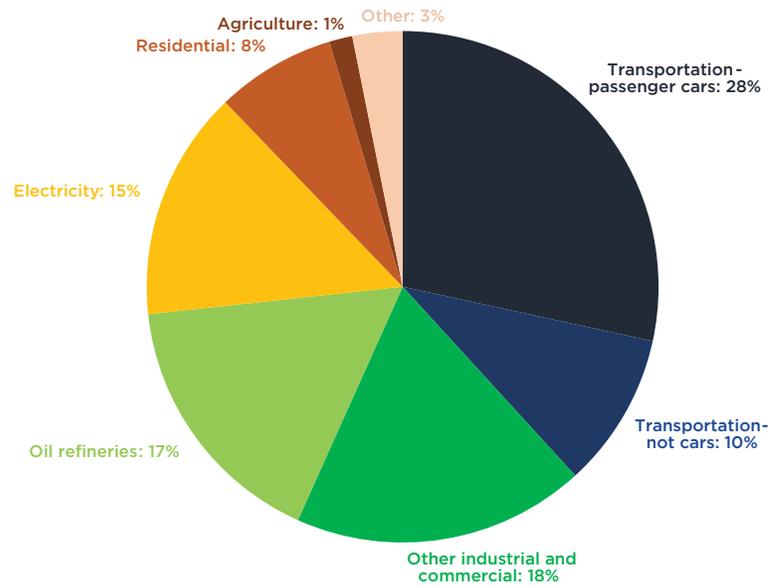
26 Debra Kahn, “Brown goes to China, calls it the world’s ‘hope’ on climate,” *E&E News*, June 5, 2017, <https://www.eenews.net/stories/1060055521> (accessed on July 6, 2020).

27 Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, “Indicators of Climate Change in California,” 2018, <https://oehha.ca.gov/climate-change/report/2018-report-indicators-climate-change-california>

28 Chris Busch and Robbie Orvis, “Insights from the California Energy Policy Simulator,” Energy Innovation publication, 2020, <https://energyinnovation.org/publication/california-energy-policy-simulator-insights-current-emissions-trajectory-policy-opportunities-to-reach-2030-emissions-reduction-goal/>

FIGURE 4
Passenger Cars Are Our Single Biggest Source of Climate Pollution

Share of million metric tons of carbon dioxide equivalents for the Bay Area in 2014



Drivers Pay Less and Less for the Roads They Use

California collects and spends \$5.5 to \$7.2 billion per year through the state gas tax.²⁹ The gas tax largely funds highways and local roads and streets. The tax increase authorized with the passage of the Road Repair and Accountability Act (SB 1) in 2017 also funds critical transit investments.

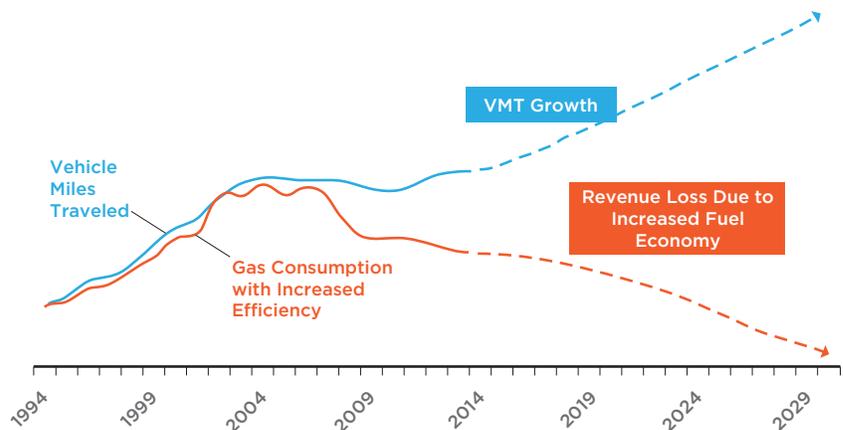
With its Advanced Clean Cars policies, California has led the nation in the adoption of electric and other zero-emissions vehicles,³⁰ a critical component of improving local air quality and reducing climate pollution. However, as passenger cars rely less on gasoline, drivers buy less gas, and gas tax revenues are less able to fund the maintenance and repair of basic transportation infrastructure.

Figure 5 highlights the divergence in expected vehicle miles traveled (VMT) and gas tax revenues. As VMT increases, revenue needed to maintain roads and infrastructure lags more and more. As this report looks at the costs driving imposes on others and how pricing can help correct them in the decades to come, it cannot leave out that new prices need to also create a fair and more sustainable way to fund roads and critical transportation infrastructure.

FIGURE 5
Californians Are Expected to Log More Miles and Pay Less for Them

Historic and projected vehicle miles traveled and gas consumption in California

As cars run on less gas, drivers pay less gas tax for the upkeep of roads and basic infrastructure. At the same time, Californians are driving more miles.



29 California Governor's Budget Summary for FY 2019-20, page 174, <http://www.ebudget.ca.gov/2019-20/pdf/BudgetSummary/RevenueEstimates.pdf>

30 See: California Air Resources Board, "Zero-Emission Vehicle Program," <https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program/about> (accessed on July 12, 2020).

The declining power of the gas tax has been a policy conversation for years, but has not been solved. In addition, the serious and widespread problems that come with our region's reliance on driving alone are not new. Bay Area policymakers have invested millions in critical transit infrastructure and services, and cities and employers have taken steps to encourage commuters away from driving alone through some of the most comprehensive transportation demand management (TDM) programs in the country. While important, these efforts have simply not been enough to reverse the growth of congestion, pollution, and safety threats from cars. We still sorely need innovative solutions and leadership in overcoming our entrenched drive-alone patterns and fairly funding our transportation future.

Chapter 2

Why Most in the Bay Area Drive Alone

Understanding the reasons why so many drive alone is critical in designing policies that shift as many of these trips as possible into alternative modes. These reasons fall into two broad categories. First, there are long-lasting conditions and choices that include the region's spread-out nature, where people are able to live and work and whether they own a car. Second, drive-alone rates are shaped by more marginal or trip-specific conditions — the per-trip cost, time, reliability and convenience of driving compared to any alternatives.

Long-Lasting Conditions Have Led to Reliance on Driving Alone

Many of the Bay Area's job centers and residential neighborhoods were built after car use became widespread in the mid-20th century. Since then, planners and policymakers have invested vast sums of public money in roads, parking and other projects that have resulted in extensive low-density land use patterns. Together, these investments create a sweeping landscape where, for almost every trip in every direction, it is many times faster and more convenient to drive a personal car than to use any other mode. For many trips, whether commutes, errands or shopping runs, driving and carpooling are the only options.

In fact, only 20% of Bay Area jobs are within a walkable half-mile of BART or Caltrain, the most used regional rail operators.³¹ As seen in Figure 6, the Bay Area has multiple job centers spread out across a hundred-mile area. Around these job centers housing is often scarce, spread out and expensive. Many workers have moved far away from job centers to afford housing, and face commutes where driving or carpooling are the only realistic ways to get to work. This reality is also seen in Figure 7, which shows that for most of the largest job centers in the Bay Area, average commute distances increased more than 30% between 2002 and 2017.

There are many reasons why land use has generated an expensive, sprawling pattern, and the hidden cost of parking and storing private vehicles is one of them. While difficult to quantify, the total hidden cost of parking is likely quite large. TransForm studied parking utilization in a sample of residential buildings across the Bay Area, and the results showed that in just 80 residential buildings, \$198 million has been spent in construction costs for parking spaces that are largely unused.³² As part of SPUR's forecasting of new housing, as many as 357,000 new multifamily units could be built in the region over the next 50 years. If we continue to overbuild parking, this could result in tens of thousands of unused spaces. This space could be better used for additional housing units and to moderate new housing costs, especially for families and households with limited incomes.

31 SPUR, *Rethinking the Corporate Campus*, 2017, page 22: <https://www.spur.org/publications/spur-report/2017-04-20/rethinking-corporate-campus>

32 TransForm, "GreenTRIP Parking Database," <http://database.greentrip.org/> (accessed on July 18, 2019).

FIGURE 6
The Bay Area's Many Job Centers Help Make Driving Along the Top Commute Mode

Jobs per acre, shown by quarter square mile

Just 15 cities host 55% of the region's 3.9 million jobs, but they span 100 miles from Santa Rosa to San Jose. Job density across cities also varies: It is greatest in downtown San Francisco and Oakland, and much lower across the Silicon Valley cities from Redwood City to San Jose.

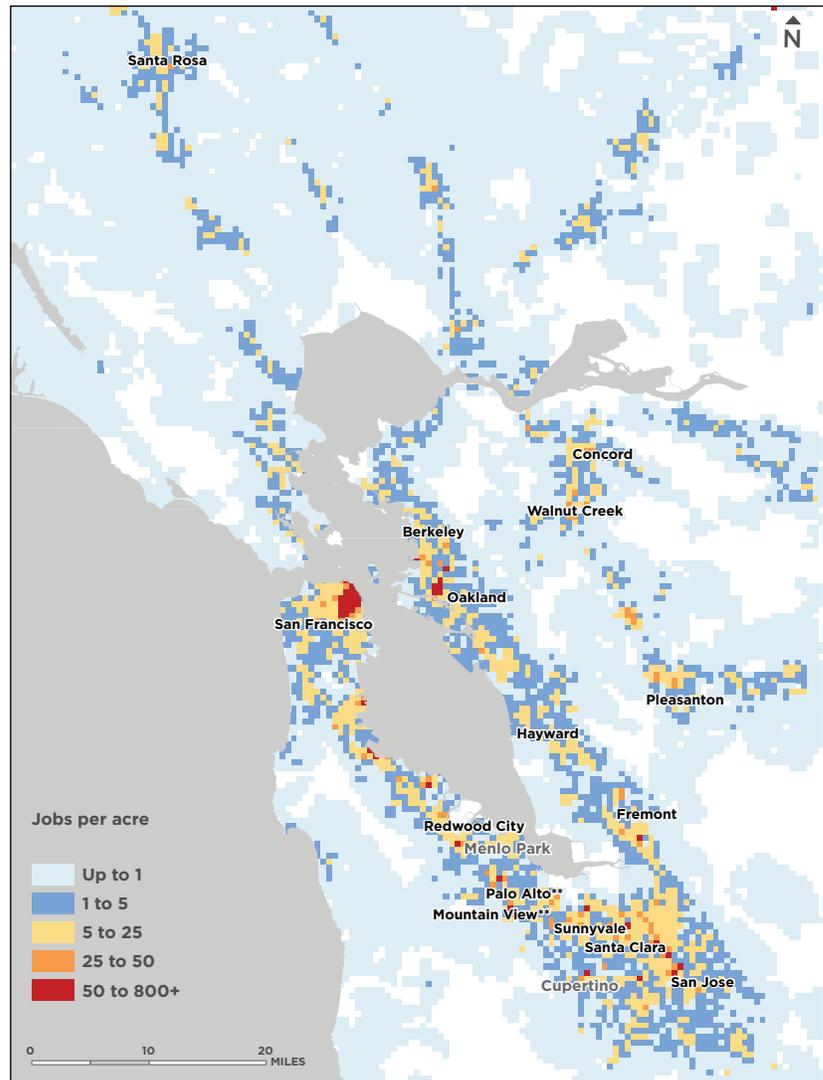
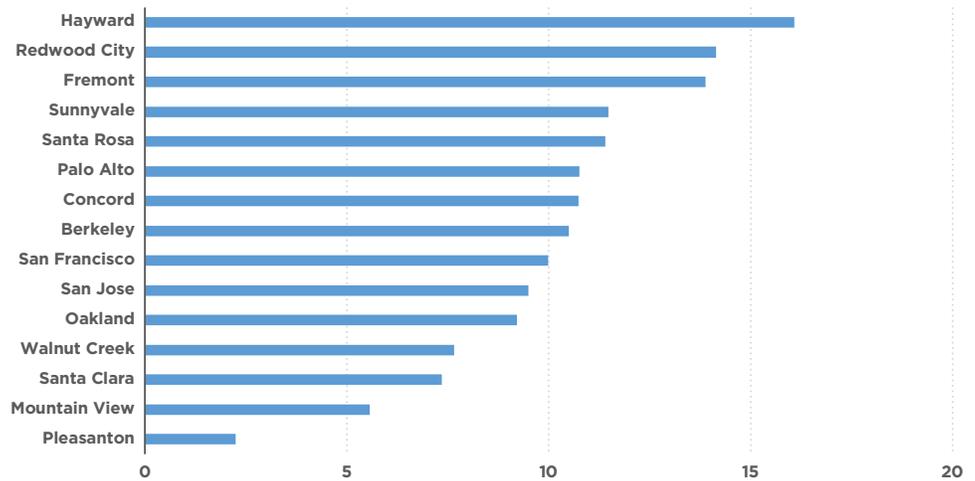


FIGURE 7
Bay Area Commutes Have Gotten Much Longer in the Past 15 Years

Change in average commute distance between 2002 and 2017

The cities shown below represent the 15 largest in terms of jobs in 2017. Commutes to jobs in them have grown by 10 or more miles in most cases. This roughly equates to growth in miles by more than 30%.³³



33 Averages have been weighted by number of jobs.

Given the immense public investment in car infrastructure, and the residential areas and job centers that rely on them, individuals and households are most often left choosing among owning and operating a car, carpooling or having limited mobility. Between 2000 and 2015, car ownership rose dramatically—in Southern California, the number of households without a car dropped 30%.³⁴ Amid the pandemic, the majority of travelers are choosing car travel over all other modes, both now and perhaps into the future.³⁵ More cars on the roads mean greater social costs.

Day to Day Conditions That Affect Trip Choice

Once a person has a car, they are simply more likely to use it. The question becomes: How can policymakers help all travelers choose alternatives to driving alone as much as possible?

For many drivers, owning a car is the primary option for personal travel. The car payment, insurance and other monthly and annual costs allow drivers the option to get up and go whenever needed. But costs that accrue for each additional trip — gas, tolls and parking — can play a role when a person is choosing between driving and another alternative. While mode choice is influenced by many things — including the weather, the convenience of different modes, how safe each feels and whether cargo space is needed — the time and cost of each option are big factors.

Figure 8 lists a handful of trips and the mode with the cheapest trip cost (aside from the sunk monthly costs of car payments, insurance, etc.) and the fastest time. The trips where transit is time or cost competitive with driving also tend to be those with lower drive-alone commute rates. For example, the Oakland-to-San Francisco trip is both cheaper and faster by BART. Combined with Oakland and San Francisco's density around BART stations, this encourages a much lower drive-alone rate than in the majority of the region. The drive-alone rate for Richmond-to-Berkeley commuters is also less than the regional average of 76%. While driving is fast and cheap for this trip, both BART and bus are not far behind it. For the other three trips, driving is often much faster or much cheaper.

34 M. Manville, B. Taylor and E. Bloomenburt, "Falling Transit Ridership: California and Southern California," UCLA Institute of Transportation Studies, 2018, page 9, <https://www.its.ucla.edu/2018/01/31/new-report-its-scholars-on-the-cause-of-californias-falling-transit-ridership/>

35 CarGurus, "US COVID-19 Sentiment Study," June 2020, https://dealers.cargurus.com/rs/611-AVR-738/images/June_Covid19-SurveyUS.pdf

FIGURE 8
When It's Faster or Cheaper,
Commuters Often Choose
Driving Alone

The fastest and cheapest modes for a sample of Bay Area commutes. Trip costs include gas, tolls and transit fares; monthly car payments and other sunk costs are excluded. Trips are one-way.³⁶

TRIP	LAND-USE TYPE OF START AND END CITIES	FASTEST	CHEAPEST	DRIVE-ALONE COMMUTE RATE
Oakland to San Francisco	Urban to urban	BART 25 min.	BART \$3.50	24%
Richmond to Berkeley	Suburban to urban	Drive 28 min.	Drive \$1.20	60%
San Jose to Palo Alto*	Suburban to suburban	Drive 48 min.	Bus \$2.25	75%
S. San Francisco to Menlo Park*	Suburban to suburban	Drive 46 min.	Bus \$2.25	79%
Walnut Creek to San Ramon	Suburban to suburban	Drive 55 min.	Drive \$1.80	76%

■ = Driving
 ■ = Transit

* When both origins and destinations are within 10 minutes of a Caltrain station, rail is faster. However, due to the low densities of these areas at the time of writing, this is likely a small percentage of trips.

Adjusting transit times and helping to make trips to and from train stations faster and easier are discussed in numerous SPUR reports.³⁷ These improvements are critical to ensuring transit can meet mobility needs. Fine-tuning the additional costs of driving can also have large impacts on how and when people take trips. For example, when carpoolers started getting charged to cross the Bay Bridge during rush hour in 2010, use of the carpool lane dropped by 26%.³⁸ Similar changes occurred in other parts of the country as well.³⁹ Changes in the everyday price of driving can have big effects on behavior. If done well, they can also have a drastic effect on travel times, congestion, emissions from idling cars and time savings for thousands of people in cars and transit alike.

³⁶ Cost to drive based on 24 mpg car and \$3.40 gallon of gas, includes non-carpool lane bridge tolls but not parking costs. All times estimated using the average of the range given on Google Map, assuming arrival of 9 a.m. on a weekday morning. Fares on bus and rail assume Clipper fares when there's a difference between cash and Clipper. All cost and time estimates were gathered in April 2018. Drive-alone commute rates are calculated from Census Transportation Planning Products Table A302103, 2010-2016 estimates.

³⁷ See: SPUR's *Seamless Transit*, 2015, <https://www.spur.org/publications/spur-report/2015-03-31/seamless-transit> *Solving the Bay Area's Fare Policy Problem*, 2019, <https://www.spur.org/publications/white-paper/2019-05-23/solving-bay-area-s-fare-policy-problem> and *The Future of Transportation*, 2020, <https://www.spur.org/publications/spur-report/2020-08-11/future-transportation>

³⁸ Deakin et al., "Bay Bridge Toll Evaluation: Final Report," University of California Transportation Center, UCTC-FR-2012-11, 2012, <http://libraryarchives.metro.net/DPGTL/harvested/2012-Bay-bridge-toll-evaluation-final-report.pdf>

³⁹ Mark Burris, Michael C. Pietrzyk and Chris R. Swenson, "Observed Traffic Pattern Changes Due to Variable Tolls," *Transportation Research Record*, 2000, Paper No. 00-1492, pages 55-59, <https://journals.sagepub.com/doi/abs/10.3141/1732-07>

Chapter 3

A Vision for How Pricing Can Create a Cleaner, Safer and Less Congested Future

If the price of transportation were reimagined so that drivers didn't impose high costs on others, what would it look like? The problems described above would be diminished — the air would be cleaner and the streets quieter and safer, especially in neighborhoods near freeways that tend to house people of color and/or low incomes. We would have a higher chance of climate stabilization and resilience from sea level rise and extreme heat, which will otherwise impair our region's most vulnerable. There would be fewer fatalities and injuries from vehicles. People would have a wider range of mobility options, from dedicated bikeways to clean and fast transit, and more. We would have more time to spend with our families, go on dates, relax or earn extra income instead of being stuck in traffic. Scarce urban space once dedicated to parked cars would be repurposed for housing, parklets and play spaces.

In this new reality, people will pay directly for the driving they do, as opposed to asking others to pay for it indirectly. It will mean drivers pay each time they park, as opposed to buying monthly passes. To enter a busy area during a busy time, drivers will pay a charge, but it will be a breeze compared to today. Driving to work in traffic will be a thing of the past, and paying to park at work, or being given cash instead, will replace it. On Spare the Air days when air pollution is high, people will drive much less to help everyone breathe a little easier (especially those with heart and lung disease). Drivers will pay a road user charge instead of the gas tax, giving them the clear option to drive less and save more. Revenues from various pricing policies will be used to fund alternatives to driving alone, to make transportation more affordable for those with low incomes, and/or to create more transportation options for those with historically few.

What would it look like to pay new charges? Travelers would have a single account from which to pay for all kinds of mobility — from parking and tolls, to buses and trains, to bike share, scooters, and more. Through this flexible payment platform, travelers could get gift cards or other perks for biking, taking the bus or whenever their trips impose fewer costs on others. The open nature of the payment platform could enable policymakers to offer tailored discounts to people with lower incomes, scale incentives for not driving alone to millions of people, and bring down the cost of administering key pricing policies. Companies would compete to help provide helpful customer service and the easiest-to-use apps to help travelers plan, reserve and pay for multi-modal trips in a few clicks. In the end, this open payment platform could enable a future where people buy trips instead of cars.

This new reality requires a different set of transportation prices. Some of the prices drivers currently pay would be replaced with others— for example, a per-mile road user charge instead of a gas tax. Others, such as congestion charges, would be new and only in place when and where there is congestion. Figure 9 lists a sample of pricing policies as well as the geography, individual behavior change and aggregate outcome they are likely to

bring about. The first step in creating a set of transportation prices that better values health, safety and cleaner air is to clarify the outcomes wanted in different geographies. Next, the pricing policy that helps achieve them can be considered and implemented.

FIGURE 9
Different Pricing Policies
Encourage Different
Behavior Changes and Policy
Outcomes

While not comprehensive, this table compares the types of individual behavior change different policies can encourage at various levels of geography, as well as their broader expected outcomes.

POLICY	DESCRIPTION	GEOGRAPHY	EXAMPLE(S)	BEHAVIOR CHANGE	EXPECTED POLICY OUTCOMES
Road user charge (RUC)	A per-mile charge levied on all drivers on all roads.	All roads across a state, multi-state region, or country.	Oregon allows drivers to pay a RUC in lieu of gas tax. In Germany, truckers pay a RUC that varies by emissions class and weight of the truck. California piloted a RUC in 2017.	Encourages drivers to save money by driving fewer miles. If RUC varies by emissions class, it can encourage adoption of cleaner vehicles.	Reduced VMT, and associated emissions, collisions and noise. More sustainable & equitable revenue source than gas tax. Can be tailored to further lower emissions and save travelers time.
Cordon pricing	A designated area that drivers pay to enter and/or exit.	Central business districts (CBDs), but can impact commuters and travelers from across a region.	Implemented in Stockholm, London, Singapore, Milan and Gothenburg CBDs. Under consideration in New York and San Francisco.	Discourages car trips into cordoned areas.	Decreased travel times for all modes in cordoned area and associated emissions, noise and collisions. Greater economic productivity from time savings.
Parking charges	An hourly or daily charge to use public street or garage parking, or workplace parking.	Cities, commercial areas, and large employers. Can impact all who travel to destinations.	Many cities operate priced street and garage parking. San Francisco updates parking rates to limit crowding.	Encourages car-pooling, transit, and shifting when to drive if parking rates vary by time.	Reduced local emissions, noise & collisions from modeshift and less circling for parking. Less demand for parking means more space for housing & other purposes. (Will not limit congestion from ride hail or future AVs.)
All lane tolling	A charge to drive on any lane. Charges can vary by level of congestion.	Bridges, highways, and arterial roads. Can impact all who travel along the tolled route.	Implemented on bridges and highways throughout the US as financing tool; under planning in Portland, OR, as a decongestion measure.	Encourages transit and carpooling to save money or time. Also encourages driving off-peak if tolls vary by rush hour.	Decreased travel times for all modes and associated emissions and collisions. Greater economic productivity from time savings.
Express lanes	A dedicated lane that allows car pools, van pools and transit free access and solo drivers access for a fee.	Highways. Can impact all who travel along the tolled route.	The Bay Area has many miles of express lanes across its freeway network, with a plan to have over 600 miles by 2035 ⁴⁰	Encourages transit and car and van pooling.	Saved time for transit riders, car and van poolers and drivers who pay. Some emissions reductions (if express lanes are not part of a highway expansion).

40 See: 511.org. "Bay Area Express Lanes," <https://511.org/driving/express-lanes/work> (accessed on April 17, 2020).

In addition to defining which problems to solve and which policy tools to use, how policies are designed is critical. Below are criteria for choosing and designing new pricing policies. These also serve as a framework for how individual policies such as parking charges or all-lane tolling will add up to a set of prices that better value peoples' safety, health and time.

Principles for an effective pricing policy:

Addresses a problem effectively. Pricing policies can be designed to limit the overall number of vehicles driving across a region, state or country, or they can be tailored to reduce congestion and free up designated downtown road segments for other uses at specific times. Clarity in the measurable goal and its geography are critical for success.

Promotes equity. Whether used to invest in transportation services that historically marginalized communities need or to reimburse people for damages from others' driving, pricing has to be designed to include an equitable process and to promote equitable outcomes.⁴¹

Avoids unintended consequences. Pricing policies can create new winners and losers. For example, a pricing policy that effectively shifts some drivers into buses can lead to bus crowding and make people who were already using them worse off. Cordon pricing can encourage drivers to pass through nearby neighborhoods to avoid a priced area, thereby causing traffic in those neighborhoods. Anticipating and designing policies to avoid such outcomes is important.

Is easy to understand. Pricing policies should be straightforward so people can easily make travel decisions that are good for themselves and others. The tradeoffs of choosing to drive over other modes should be obvious and easy to know in real time using well-designed apps, websites or dial-in numbers for those without smart phones or internet access.

Is flexible in an ever-changing world. The COVID-19 pandemic has shown us how quickly the world can change. Pricing should be able to ramp up or down or shift geography in light of the many changes that are looming. This means fee collection should be software-based when possible (people can pay by phone) instead of infrastructure-based (people have to pay at a toll plaza).

Protects privacy. Software-based pricing technology needs to protect privacy. Ongoing effort is needed to anticipate and block attempts to use private data outside of pricing policies.

Proves its benefits. A new price on *my* driving is easier (and more painful) to understand than the benefits of *everyone* driving less. As seen in London and Stockholm, pilots that prove the benefits of everyone driving less are needed both to test policy design and to create pricing champions.⁴²

41 Stuart Cohen and Alan Hoffman, "Pricing Roads, Advancing Equity," TransForm, 2019, <https://www.transformca.org/transform-report/pricing-roads-advancing-equity>

42 In their paper, Manville and King argue that proving benefits of pricing through pilots is more credible than promising use of revenues. M. Manville and D. King, "Credible commitment and congestion pricing," *Transportation*, 40, July 1, 2012, pages 229-249, <https://link.springer.com/article/10.1007/s11116-012-9430-9#citeas>

Chapter 4

How to Value People Over Cars

This chapter outlines transportation pricing policies that ask individuals to pay for the driving they do and offers relative discounts to those who drive less and impose fewer costs on others. The following five strategies and 15 recommendations outline a broad vision for creating transportation prices and platforms that do just that.

Strategy 1 begins with equity. As policymakers and communities co-design how to replace existing, hidden prices with more transparent policies such as parking and congestion charges, it is critical to ensure no additional harm to drivers with low incomes.

Strategy 2 explores how parking charges and limiting parking oversupply can shift people out of drive-alone trips.

Strategy 3 grapples with how to mitigate congestion in its various forms through tailoring parking rates, establishing downtown congestion charges, better enforcing rules in carpool and express lanes and creating strategies for all-lane tolling.

Strategy 4 outlines road user charges as a replacement to the state gas tax — a policy that would more fairly charge people for the driving they do, as well as stabilize transportation infrastructure funding. It could also eventually help align all driving prices into a single platform.

Strategy 5 discusses two separate pioneering ideas: how to use pricing policies to help achieve regional clean air goals, and how to create the technology and pricing platform required to more clearly communicate the relative prices of different modes, offer incentives for drive-alone alternatives to millions of people at once, and reduce the administrative costs of key pricing policies.

As policies in Strategies 2 and 3 are put in place, travel patterns will change. For example, comprehensive parking charges and policies alongside incentives (Strategy 2) may effectively reduce drive-alone trips and obviate the need for all-lane tolling (a policy within Strategy 3). Or the package of policies in Strategy 2 may lead to a boom in ride-hailing that necessitates all-lane tolling. How Strategies 2 and 3 dynamically work together will require real-world testing and more study. Ultimately, policymakers will need to define measurable outcomes for the policies in Strategies 2 and 3 — for example, how uncongested specific areas should be — and track progress and adapt pricing policies to meet goals.

Outlined together here, these five strategies and 15 recommendations offer an extensive look at tools to manage the many social costs of driving across a varied Bay Area landscape.

Strategy 1

Prioritize Equity in Policy Design and Outcomes

Much work has been done to help policymakers and communities define, measure and improve equity in transportation.⁴³ In particular, TransForm has synthesized an array of work and case studies and has developed guidance and a toolkit to advance equity in transportation pricing. This toolkit is being used in pricing policy development in various metro areas today.

TransForm defines two important elements of equity in transportation pricing: process and outcome. An equity *process* is the degree to which vulnerable communities are involved in the planning, implementation and follow-up of any pricing policy.⁴⁴ Equity *outcomes* are affordability, access to opportunity and community health.

Recommendation 1

Dedicate staffing to ongoing equity outreach and other processes

Who's responsible: *Cities, Congestion Management Agencies (CMAs), Metropolitan Transportation Commission (MTC)*

Tailoring transportation pricing policies both to meet local transportation challenges and to advance equity is not a one-size-fits-all exercise. It requires context-specific care, consideration and work. Staff at transportation agencies will need to be devoted to crafting equity processes as pricing policies are created, evaluated and adapted over time.

In addition, the work of advancing equity in transportation pricing requires time. In its toolkit for policymakers and equity advocates, TransForm details five iterative steps:⁴⁵

- 1) Identify who, what and where: Identify the populations that need to be considered from an equity perspective and the types of pricing policies under review and their alternatives, and define the geographic extent of the policies.
- 2) Define equity outcomes and performance indicators: The measure of success requires setting clear, often measurable goals and ranking them in order of importance.
- 3) Define benefits and burdens: The impacts of any pricing policy and its alternatives need to be considered in terms of their scale, the interest of communities in those impacts and the potential to help or hurt communities.
- 4) Choose policies and programs: Pricing policies need to be considered alongside programs to bring about affordability, access and health improvements for vulnerable communities. Because there are many ways to design each pricing policy as well as equity programs alongside it, decision makers need to consider and evaluate many alternatives, often iterating, before choosing a program for implementation.

43 See: National Academies of Sciences, Engineering and Medicine. "Environmental Justice Analyses When Considering Toll Implementation or Rate Changes—Final Report," The National Academies Press, 2018, <https://doi.org/10.17226/24992> and the Greenlining Institute, "Mobility Equity Framework," 2018, <https://greenlining.org/publications/2018/mobility-equity-framework/>

44 Stuart Cohen and Alan Hoffman, "Pricing Roads, Advancing Equity," page 17.

45 Ibid., page Tk-3.

- 5) Provide accountable feedback and evaluation: Unlike most transportation projects, pricing programs can be dynamic and could be adjusted at regular intervals. That is why it is essential that there are clear avenues for communication, ways to get feedback from affected communities, and to compare the implementation to the proposed equity goals and adjust the program as needed.

Staff dedicated to leading the equity efforts may either be full time at an agency or external experts who help facilitate equity processes on behalf of agencies. Either way, the people who “own” equity will need to be given real authority and included in the decision-making processes at agencies.

Addressing equity in the design of pricing policies is already taking root. For example, in Vancouver’s exploration of congestion pricing, fairness and equity have been core tenets from the beginning. The city’s public engagement efforts included rounds of polling, multilingual campaigns through numerous outlets, workshops, translation of materials into non-English languages, surveys and the convening of a User Advisor Council, made up of 15 representative Vancouver residents to advise at key points throughout the process.⁴⁶ In its 2019 launch of a downtown congestion pricing study, the San Francisco County Transportation Authority (SFCTA) focused heavily upfront on outreach to vulnerable communities and is working with an ongoing focus on equity and affordability.⁴⁷

While there are these and other examples to point to, agency staff are often under pressure from competing priorities and budget shortfalls. It isn’t always easy to redirect staff time and resources to new processes, but there are more tools to advance equity in transportation pricing than ever before, and it is the just thing to do.

Recommendation 2

Establish means-based subsidies or discounts for new pricing policies

Who: MTC, Congestion Management Agencies (CMAs), cities, various state agencies, community groups, researchers, equity advocates

While all drivers should have the option to change their behavior based on pricing, any policy that puts a single price on transportation access will be regressive, as lower-income households will spend a greater percentage of their income on it. There are many ways to address this, however. For example, the tolls or parking charges people pay could vary by income, income tax credits could be given to lower-income drivers,⁴⁸ some of the revenues could be given back to drivers through a cash subsidy or loaded Clipper card,⁴⁹ other regressive taxes that pay for transportation (such as sales taxes) could be offset with revenue from new pricing policies or a combination of these.

In any of these cases, the following considerations are critical:

46 Mobility Pricing Independent Commissions, City of Vancouver, BC, “Metro Vancouver Mobility Pricing Study: Findings and Recommendations for an Effective, Farsighted, and Fair Mobility Pricing Policy,” May 2018, www.itstimemv.ca/uploads/1/0/6/9/106921821/mpic_full_report_-_final.pdf

47 The SFCTA’s webpage on downtown congestion pricing lists their outreach as well as ways for community members to get involved: <https://www.sfcta.org/downtown> (accessed on July 10, 2020). They have also published a brief, “How might congestion pricing advance equity in San Francisco?” February 13, 2020, <https://www.sfcta.org/sites/default/files/2020-02/Briefing%20Paper%203%20-%20Equity%20200213.pdf>

48 In its implementation of congestion charging in Manhattan, New York will make residents within the pricing zone who earn less than \$60,000 eligible to receive a tax credit. See: Azi Paybarah, “Congestion Pricing: Who Pays and Who Doesn’t,” *The New York Times*, April 18, 2018, <https://www.nytimes.com/2019/04/18/nyregion/newyorktoday/nyc-news-congestion-pricing.html>

49 An example of a regular rebate is the California Climate Credit, which is given back to electricity and natural gas customers of the state’s three largest utilities. This credit was originally designed to mitigate the regressive nature of higher energy prices under the state’s cap-and-trade program to reduce climate pollution. See California Public Utilities Commission, “California Climate Credit,” <https://www.cpuc.ca.gov/ClimateCredit/> (accessed on May 18, 2020).



Define “low income.” Policymakers could define “low-income” drivers based on a single poverty threshold, as is done in programs like Clipper START, the means-based fare pilot that started in 2020 and is available to approved transit riders making up to 200% of the federal poverty level.⁵⁰ A single poverty threshold also applies to electricity and phone service discounts.⁵¹ Another approach is to establish a set of graduated discounts based on income tiers, so the less you make, the less you pay. This is the structure behind the state’s CalFresh food benefit (food stamps), where the maximum monthly food benefit increases with need.⁵² The SFCTA is also considering two different discounts in its study of congestion pricing for downtown San Francisco — an exemption for drivers with very low incomes and a 50% discount for drivers with low incomes.⁵³ Multi-threshold discounts are more progressive and avoid the disincentive that people with very low incomes face: If their income increases just enough to cross a single threshold, they lose access to multiple discounts and benefits at once.

Address affordability as quickly as possible. People with lower incomes should not have to wait to get a subsidy or other form of value. Waiting for money on a tight budget can mean forgoing essentials. Different methods can address affordability upfront. For example, employers that know the incomes of employees can deliver cash or loaded Clipper cards to low-income workers at the beginning of the month to offset employee parking charges. For tolls and other charges, means-based rates could be set in which lower-income drivers pay a lower charge to begin with.

Start simple, and aim for more targeted affordability measures over time. For some policies in the near term, issuing subsidies at the end of the month based on a single poverty threshold may be the only possibility. This would be a good first step, but policymakers should problem solve for how to build in progressive discounts tied to multiple income tiers and how to deliver them instantly. In other words, they should work toward multi-tier, means-based pricing. This will require setting up new relationships between agencies at various levels of government and creating new operations. To play out one possible example, state agencies that handle income data for tax and benefits purposes, such as the Employment Development Department (EDD), could be linked securely with transit and transportation payment accounts such as Clipper and FasTrak. The EDD could receive names and account IDs from transportation agencies, and could send back the discount level without names, to protect privacy. Such systems would require robust data sharing agreements, data security systems and customer service. These costs could be high. However, if, over time, progressive discounts were applied across many different kinds of transportation pricing, there would be economies of scale for administering them. In addition, with open payment platforms discussed in Strategy 5, costs could come down.

50 See: MTC, “Clipper START,” <https://mtc.ca.gov/our-work/plans-projects/other-plans/means-based-fare-discount-program> (accessed on May 18, 2020).

51 Pacific Gas & Electric offers low-income customers and households discounted electricity and gas services through its CARES and FERA programs, see: https://www.pge.com/en_US/residential/save-energy-money/help-paying-your-bill/longer-term-assistance/care/care.page?WT.mc_id=Vanity_carefera. Similarly, the Federal Communications Commission offers households with incomes up to 135% of the federal poverty line discounted phone services through its Lifeline program, see: <https://www.fcc.gov/lifeline-consumers> (both accessed on September 20, 2020).

52 Need is determined both by household income and household size, see: CalFresh, “The fresh guide to EBT in California: food stamp (SNAP) eligibility,” <https://www.freshebt.com/state/california/food-stamps-eligibility-income-limits/> (accessed on September 20, 2020).

53 See: SFCTA, “Downtown Congestion Pricing,” <https://www.sfcta.org/downtown> (accessed on May 14, 2020).

Strategy 2

Encourage Alternatives to Driving Alone Through Pay-to-Park Charges, Incentives and Limiting the Oversupply of Parking

Every drive-alone car trip starts and ends with parking. When parking is free, driving comes easily, as do traffic, emissions, noise and collisions.⁵⁴ In addition, “free” parking eats up valuable space and makes both commercial and residential properties more expensive to build, buy and lease.

How a city and region manage parking supply and demand will fundamentally shape how, when and whether people drive to get where they need to go. Unlike other prices on driving, paying for parking is something drivers are used to doing. Cities are often also accustomed to administering parking fees. These reasons combined mean that parking pricing policies could prove to be particularly powerful and practical in limiting the social costs of driving.

The set of recommendations in this strategy could work in isolation, but they are more likely to succeed if treated as a package. They represent ways to establish charges every time a driver parks and to reward people every time they don’t drive, as well as to help create alternatives to driving alone, to contend with the oversupply of parking, and to ensure parking space availability in busy areas. Together, these recommendations have the potential to drastically reduce drive-alone rates and give people back time lost in traffic, reduce collisions, clean the air and improve public health.

Recommendation 3

Prohibit monthly parking passes

Who’s responsible: *Cities, large institutions that offer monthly parking*

Monthly parking passes are a steal. They discount trips for individual drivers — but at a cost to others in the form of congestion, emissions and poorer health. They are a way of subsidizing driving and are used more often by people with higher incomes. They discourage trips other than driving alone because once drivers pay for a monthly pass, they can drive and park as much as they want for no extra charge, while transit and other options would require an additional cost.

How much do monthly parking passes subsidize driving? To draw a few examples, monthly rates run an average of \$350 in San Francisco, \$145 in Oakland, and \$100–\$125 in San Jose.⁵⁵ Compared to paying for parking every weekday in a month (roughly 22 days), these monthly passes represent roughly a 20%, 67% and 80% discount on driving, respectively.⁵⁶

Cities across the region should prohibit the sale of monthly parking passes for public spaces (including municipally owned and privately owned garages that provide public parking). Businesses and institutions that charge for parking should explore how to do the same.

⁵⁴ Donald Shoup, *The High Cost of Free Parking*, American Planning Association, Routledge press, March 2005.

⁵⁵ For San Francisco and Oakland rates see: <https://monthlyparking.org/>, for San Jose see: <https://parksj.org/parking-programs-services/monthly-passes/> (both accessed on September 12, 2020).

⁵⁶ Daily rates were taken for San Francisco and Oakland from SpotHero: <https://spothero.com/>. Daily rates for San Jose were taken from the four ParkSJ garages where monthly passes are also offered: <https://parksj.org/parking-programs-services/monthly-passes/> (both accessed on September 12, 2020).



Eliminating monthly parking passes requires less infrastructure, enforcement and new administrative services compared to setting up new parking charges. In addition, the need to pay daily, and the loss of the parking subsidies, will encourage some drivers to choose alternatives to driving alone. This can decrease congestion, emissions and safety threats in measurable ways. In other words, this recommendation is relatively simple and likely to deliver real results. To help spur cities to lead on this, MTC could condition grant funding on having this policy in place.

Recommendation 4

Establish a regional transportation demand management (TDM) program

Who's responsible: MTC, Bay Area Air Quality Management District (BAAQMD), employers, transportation management associations, state legislators

While this report is almost entirely about how pricing can help shift people into alternatives to driving alone, transportation demand management (TDM) programs are critical in providing those alternatives, or in making them affordable, particularly for commuters.

Cities, companies, institutions and policymakers in the Bay Area have come up with innovative incentives to encourage workers out of drive-alone commutes. For example, as part of the Bay Area Commuter Benefits Ordinance, all employers with 50 or more employees have to offer workers pre-tax benefits in the form of a monthly subsidy for transit, carpooling or vanpooling, and/or provide transit directly. The Bay Area is also home to exemplary TDM programs voluntarily offered by employers and TMAs. For example, Stanford University's suite of TDM policies — such as parking management, free shuttles to Caltrain stations, a Commute Club, biking amenities and more — brought its drive-alone rate down from 69% to 43% between 2003 and 2017.⁵⁷ Free shuttles to rail stations, guaranteed rides home for non-drivers and bike incentives are also found across the Bay Area from Emeryville to Hacienda Business Park and the City of Pleasanton, Bishop Ranch and the City of San Ramon, Mission Bay in San Francisco and more.⁵⁸ Recently, MTC has also bolstered region-wide commuter incentives through MTC SHIFT, a partnership with large employers (3,000 employees or more) where MTC covers up to 75% of the cost of commute management software through RideAmigos, Luum or RideShark.⁵⁹

Overall, these strategies aren't quite enough, though, as drive-alone commute rates across the region remain high, as seen in Figure 2. In addition, most employers in the Bay Area are small and not subject to the Bay Area Commuter Benefits Ordinance. Also, BAAQMD, the agency responsible for its enforcement, finds its role challenging because it does not have access to complete records that list the employer size, exact location and contact information for all employers throughout the Bay Area.

Statewide legislation to create a minimum regional TDM program for all workers could build off and strengthen the Commuter Benefits Ordinance and expand existing TDM programs. Such a program would require employers or TMAs to establish a set of incentives and ways to commute in any way except driving alone, and should have at least the following elements:

Performance goals. The regional TDM program should start simple, where success means that all workers receive incentives for non-drive-alone commutes. In its next phase, the region could establish

⁵⁷ See: Stanford "Community Plan General Use Permit, Community Benefits, Transportation," <https://gup.sites.stanford.edu/transportation> (accessed on June 12, 2019)

⁵⁸ SPUR, *Driving Change*, 2019, pages 11-12, <https://www.spur.org/publications/white-paper/2019-12-18/driving-change>

⁵⁹ See: MTC, "New Partnership Program Helps Big Employers SHIFT Workers' Commute Choices," <https://mtc.ca.gov/whats-happening/news/new-partnership-program-helps-big-employers-shift-workers-commute-choices> (accessed on August 12, 2020).

targets for drive-alone rates or total VMT. There could be a region-wide target or various targets for different geographies and/or employer sizes and types. To establish such targets, state legislation would need to replace parts of SB 437, a 1995 state law that prohibits mandated trip caps for employers.⁶⁰ To measure progress toward chosen metrics, MTC could create surveys that employers and TMAs administer annually to all employees. Alternatively, MTC could administer a survey of the region based on a representative sample of commuters. Ultimately, it will be important to track performance so that our region can effectively iterate on TDM measures and rein in the social costs of drive-alone commutes.

Eligible TDM policies. MTC could draw from the numerous examples of TDM policies and practices in the Bay Area to create a set of options that would qualify toward the regional program. San Francisco's point-based menu of TDM measures that employers can choose from is a particularly helpful example.⁶¹ As long as employers or TMAs reach a certain point total and/or performance goals, they could meet the TDM requirement in whatever way best suits their particular context (suburban, dense downtown, etc.). In addition, employers with existing TDM programs, no parking, or priced parking at the start of the regional TDM requirement could be considered in compliance unless they later fail to meet any performance metrics.

Considerations for employer size. Large employers often have more capacity to operate and maintain TDM programs, and some already offer them. However, 66% of employees work at companies with fewer than 100 employees.⁶² Small employers should be able to comply with the regional TDM requirement by encouraging workers to participate in overarching incentives offered by cities or TMAs.⁶³ In addition, MTC's SHIFT program could expand in a future phase to smaller employers. Ideally, all who commute could participate in TDM programs, including part-time and contract workers.

Verification and enforcement. Employers could comply with the new mandate by reporting their list of TDM measures to MTC annually. Trip tracking platforms like RideAmigos, Luum and RideShark, as well as standardized data sharing guidelines, could streamline reporting. In addition, enforcement could be made easier if employer size, location (whether headquarters are inside the Bay Area or not) and contact information for employers were shared as part of annual reporting. This would make enforcement easier than it is today. Enforcement could also be bolstered through site audits to verify reported TDM measures. Penalties for non-compliance should also be set and could be modeled after the San Francisco Commuter Benefits Ordinance, which includes fines for the number of days an employer is not in compliance.⁶⁴

60 See Leginfo, "SB 473," http://leginfo.ca.gov/pub/95-96/bill/sen/sb_0401-0450/sb_437_cfa_950828_150028_asm_comm.html (accessed on August 12, 2020).

61 San Francisco Planning Commission, "Standards for the Transportation Demand Management Program," pages 12-14, https://default.sfplanning.org/transportation/tdm/TDM_Program_Standards.pdf

62 SPUR analysis of the US Census Bureau's Statistics of US Businesses, 2016 County Business Patterns, see: <https://www.census.gov/programs-surveys/susb.html>

63 The city of Bellevue, WA provides a great example and has brought drive-alone rates down significantly. See: City of Bellevue, Bellevue "Transportation Demand Management Plan: 2015-2023," December 2015, https://bellevuewa.gov/sites/default/files/media/pdf_document/transportation-demand-management-plan01152016.pdf

64 See: SFEnvironment, "San Francisco's Commuter Benefits Ordinance," <https://sfenvironment.org/commuter-benefits-ordinance-sf> (accessed on September 20, 2019).

Recommendation 5

Require Bay Area employers to charge a daily minimum for the parking they provide

Who's responsible: MTC, BAAQMD, state legislators

Why consider employer parking charges? Commutes make up a great deal of trips and often contribute the most to congestion and its side effects of lost time and emissions from idling cars. In addition, every commuter driving to work has to park somewhere. This is true from the region's busy downtowns to its suburban office parks. Parking charges can apply everywhere.

There is also wide agreement that charging for parking at work helps shift workers out of drive-alone commutes. For example, a survey of Bay Area commuters showed that 75% of those who had free parking at work drove alone, compared to just 37% of those without free parking.⁶⁵ (In the Bay Area, priced parking coincides with dense areas rich in transit as well.) Foundational analyses of parking studies find that pricing can shift between 19% and 81% of drivers from solo commuting to carpooling, transit and other options.⁶⁶ A recent study of parking pricing across California's transit-rich centers and transit deserts alike found that a 10% increase in parking prices would reduce drive-alone rates by 1%.⁶⁷ In addition, parking charges can create a sustainable funding source for TDM programs, and/or can be directly returned to commuters through parking cash out — so that commuters who drive alone to work pay a parking charge, and those who don't receive a subsidy from the parking revenue.

In addition, such parking charges would need to be regional to level the playing field across Bay Area employers, as no one employer will be able to start charging for parking on their own. The barriers to charging for parking — labor bargaining agreements that include free parking as a benefit, building lease agreements that include parking, logistics of fee collection and enforcement — are too many. In addition, employers are concerned that parking charges would encourage talented workers to choose other jobs.⁶⁸ To bridge the gap between what employers can effectively pioneer on their own and the potential benefits of parking charges, the Bay Area should establish a policy that employers charge a daily minimum for the parking they provide. This would also have to extend to property managers that supply parking for employers.

There are many important policy features to consider in creating a minimum employer parking charge:

Pilot implementation. Because charging for parking at employer sites is rare, pilots that test implementations of charges at scale would be valuable.⁶⁹ A pilot phase could also help prove its benefits — less congestion and more predictable commute times, cleaner air and quieter and safer streets — which may be helpful in creating acceptance.

Decide who must comply. Minimum employer size is often used as a way to determine who must comply. However, where a company is headquartered and whether part-time and contract workers count toward the total complicate this idea. Instead, every employer that operates parking should comply, as

65 SFMTA, "Putting Theory Into Practice: Pilot Project Summary and Lessons Learned," SFpark, June 2014, Page 40, https://www.sfmta.com/sites/default/files/reports-and-documents/2018/08/sfpark_pilot_overview.pdf

66 Richard W. Wilson and Donald Shoup, "Parking subsidies and travel choices: Assessing the evidence," *Transportation* 17, February 1990, pages 141-157. <https://link.springer.com/article/10.1007/BF02125333>

67 Nagwa Khordagui, "Commute Mode Choice, Parking Policies, and Social Influence." UC Irvine Electronic Theses and Dissertations, 2019, Chapter 1, <https://escholarship.org/content/qt07z507xf/qt07z507xf.pdf?t=puddbf>

68 SPUR, *Driving Change*, 2019

69 The Mobility on Demand Fair Value Commuting demonstration project ended in 2019 and offers valuable insights for future pilots. See: Federal Transit Administration, "Mobility on Demand (MOD) Sandbox Demonstration: Fair Value Commuting Final Report," Report 0167, <https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-demonstration-fair-value-commuting-final-report>

should parking managers that supply employee parking. While implementation may need to be tailored to different contexts across the Bay Area, all employees should face the true cost of driving by paying for parking.

Establish the right charge. The actual amount of the charge may be less important in changing behavior than simply having a visible charge.⁷⁰ However, it should be tagged roughly to the cost of a typical round-trip transit ride in the Bay Area and should be uniform across the region to keep a level playing field across employers. In addition, daily charges (as opposed to monthly) can reward commuters for taking transit and other modes most of the time, while also recognizing that driving is necessary some days.

Give workers with low incomes upfront subsidies. At the beginning of the month, workers with lower incomes should be given a subsidy in the form of a loaded transit card or cash, whichever they prefer. They should receive it at the beginning of the month so that they don't have to forgo essentials throughout the month to cover new transportation costs. The incentive to not drive alone would remain; to park they would have to spend the subsidy on parking, while carpooling and other options would let them keep it.

Invest revenues wisely. Revenue from parking charges should be used to support and encourage non-drive-alone commutes. Employers should be able to invest it in TDM programs and give revenue back to workers in the form of cash and other benefits. Giving a fixed amount back to all workers would help lower-income workers more than higher-income workers.⁷¹

Streamline collection and enforcement. Streamlined parking charge collection and enforcement is needed so as not to burden employers. Centralizing capital and operational efforts at the TMA level can help, particularly for small employers. In addition, MTC could provide technical assistance to employers both looking to track, collect payments and monitor enforcement through software-based systems, or to construct gates and other infrastructure.

Build parking charges into future leases and labor agreements. Not all existing labor contracts or building lease agreements will allow for parking charges right away. However, this kind of leadership is possible, as evidenced by San Francisco's renegotiation of labor contracts and elimination of free parking for employees at the start of its SFpark program in 2010.⁷²

Solve for unintended consequences. Policymakers will need to problem solve for how to dissuade drivers from parking on nearby unpriced streets or choosing single-occupancy ride-hailing services instead of driving.

70 In an evaluation of price-based incentives in Alameda County in the 1990s, it was found that any incentive was more effective than the amount itself. See: Alameda County Transportation Commission, "Countywide TDM Strategy," April 2013, page 18, https://www.alamedact.org/wp-content/uploads/2018/12/ALAMEDA-TDM-Strategy_final.pdf?x33781

71 The political pathway to creating a regional parking charge may depend on how revenues are dedicated. If all revenues from the charges were spent on employee transit and drive-alone alternative benefits, then they may be considered a "fee" under California's Proposition 26. In this case, the program could move forward with a simple-majority vote in the California legislature. If, however, the revenues from the parking charges were used for a general purpose, they may be considered a "tax," which would require a two-thirds majority approval in the state legislature.

72 SFMTA, "Putting Theory into Practice: Pilot Project Summary and Lessons Learned," SFpark, June 2014, page 38.

Recommendation 6

Limit parking supply through regulations and pricing

Who's responsible: *Cities, counties that manage land use in unincorporated areas, MTC through grants*

There are as many as four parking spaces for every car in the US,⁷³ more than all drivers could ever use at one time. It is estimated that for every 100 new parking spaces built into apartment buildings, 26 go unused.⁷⁴ Policies are needed to rein in this trend and to prevent future development from following it. After all, with limited parking spaces, the number of cars, and the social costs of driving, are also limited.

Supply can be managed directly through mandates or indirectly through pricing policies that reduce demand for parking and allow spaces to convert to other uses over time. While they are not pricing, direct regulations on parking limits are listed here briefly for completeness and for their potential to reduce drive-alone trips.

Use zoning to cap and remove parking spaces

Cities can effectively manage parking supply through establishing parking caps in zoning laws. Through parking caps, Portland cut its parking spaces per 1,000 square feet of commercial space by more than half between 1973 and 1990.⁷⁵ In addition, cities can take parking supply management a step further by setting goals to remove parking supply. For example, starting in the 1960s, Copenhagen removed 1% of its parking supply every year to help it become a city where most people bike to work today.⁷⁶

Allow residents and businesses to buy or lease parking separately to limit future supply⁷⁷

Parking spaces are almost always included in the price of an apartment, condo or commercial lease. But they shouldn't be. Residents and businesses should instead be able to decide if they want to have and pay for parking, and how many spaces they want. Seeing and paying the actual cost of parking — as opposed to having it bundled with the overall price of a home or work space — will also give developers a clearer sense of how much parking is actually in demand. Without this market feedback, developers err on the side of supplying more parking than needed. This is a costly practice both in terms of land and in the sticker price of housing and commercial space. It prices out lower-income residents and small businesses that could otherwise afford car-free home or work space.

Separating the price of parking is rare but powerful in decreasing the need for new parking spaces. Housing developments in St. Louis (MO), Berkeley (CA), Dorchester (MA) and Bellevue (WA) have demonstrated that selling parking spaces separately from housing units means that fewer of them are wanted and needed.⁷⁸ On a broader scale, San Francisco planning code requires the unbundling of parking from new residential buildings of ten units or more, setting an example for other cities to follow.

73 The Regional Plan Association, "New Directions for Commuter Benefits Tax Policy," May 2019, page 2, https://rpa.org/uploads/pdfs/RPA_Commuter_Benefits_Tax_Policy.pdf

74 See: MTC citing TransForm's GreenTRIP Database, "MTC's VPP Parking Project," https://parkingpolicy.com/reduced-requirements/#_ftn4 (accessed on September 20, 2020).

75 SFCTA, "San Francisco Parking Supply and Utilization Study," November 2016, page 37, https://www.sfcta.org/sites/default/files/2019-03/Parking_Supply_final_report_11.29.16.pdf

76 Giuliano Mingardo, Bert van Wee and Tom Rye, "Urban parking policy in Europe: A conceptualization of past and possible future trends," *Transportation Research Part A: Policy and Practice* Volume 74, April 2015, pages 268-281, <https://doi.org/10.1016/j.tra.2015.02.005>

77 This is adopted SPUR policy in San Francisco, see: SPUR, "Reducing Housing Costs by Rethinking Parking Requirements," <https://www.spur.org/publications/spur-report/2006-06-01/reducing-housing-costs-rethinking-parking-requirements> (accessed on August 12, 2020).

78 City and County of San Francisco, San Francisco planning code, Article 1.5, Section 167, [http://library.amlegal.com/nxt/gateway.dll/California/planning/planningcode?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:sanfrancisco_ca\\$sync=1](http://library.amlegal.com/nxt/gateway.dll/California/planning/planningcode?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca$sync=1)

To unbundle parking, cities can require it in municipal code or MTC can make it a condition of grant funding (such as One Bay Area grants). Landlords can also be required to charge commercial and residential tenants for spaces separately through local legislative action. Giving tenants the choice to opt out of paying for parking could prove critical for people and businesses struggling to make rent.

In addition, local and regional policymakers can also use parcel taxes — a per-space tax added to annual property taxes — to discourage future parking supply. Cities could also allow developers to pay a fee in lieu of building parking spaces.

Recommendation 7

Price public parking to achieve minimum levels of availability most of the time

Who's responsible: *Cities*

Once parking supply is better managed (Recommendation 6), cities may find that parking in front of popular businesses and other destinations is in high demand and often full. Drivers may end up circling, looking more at curbsides than the road ahead of them, and often in frustration or a rush. If this is the case, cities should use data-driven pricing to manage parking and make sure there are always a minimum number of spaces ready for drivers most of the time. Such efforts reduce the search time for parking, limit congestion and improve both road safety and commerce.⁷⁹

Such policies can be modeled after SFpark, a groundbreaking effort to manage parking demand by the San Francisco Metropolitan Transportation Association (SFMTA). SFpark set a target for how many spaces should be free at any given time (about a space per block), monitored parking space availability, and adjusted meter prices by 25 cents every three months (a quarter a quarter) until the targets were met.⁸⁰ The program also closed the gap between the cost of parking garages and street parking. Parking in garages in the Bay Area often sits empty⁸¹ while drivers circle and compete for the few unpriced spaces, causing emissions, traffic and dangerous double-parking patterns.

The City of Berkeley's goBerkeley program⁸² is a variation on SFpark, and Oakland is considering a similar approach for its downtown area.⁸³ Other cities should leverage the successes from such programs in areas where scarce public parking causes circling and congestion problems.

79 See: SFMTA, "Learn More About Demand Responsive Parking," <https://www.sfmta.com/getting-around/drive-park/demand-responsive-pricing/learn-more-about-demand-responsive-parking> (accessed on September 20, 2020).

80 See: SFMTA, "Citywide Meter Rate Adjustments," <https://www.sfmta.com/notices/citywide-meter-rate-adjustments> (accessed on September 20, 2020).

81 <http://regionalparking.mtc.ca.gov/#/research.report>

82 See: City of Berkeley, "New Rates Take Effect at goBerkeley On-Street Meters and Center Street Garage February 1, 2020," https://www.cityofberkeley.info/Public_Works/Transportation/goBerkeley_Update_February_2020.aspx (accessed on September 20, 2020).

83 City of Oakland and MTC, "Downtown Oakland Parking Management Report," 2016, <http://www2.oaklandnet.com/oakcal/groups/ceda/documents/agenda/oak057558.pdf>

Strategy 3

Manage Congestion Through Parking Rates, Downtown Charges and Tolls

This strategy outlines how pricing could be applied in different locations to tackle different forms of congestion. The costs that each extra driver imposes on others are higher in times of congestion. Many of us have seen examples of it. It's those few extra cars that tried to make it across the intersection before the light turned red, partially blocking an intersection, jamming up cross traffic and making it dangerous for pedestrians to navigate between bumpers in a crosswalk. The extra time lost, emissions, safety risks and road rage these few extra cars cause are palpable for rush hour commuters across all modes.

Traffic congestion can be caused by a crush of commuters or eventgoers all going to or leaving the same small area at the same time. It can be caused by the funneling of cars from many freeways to the entrance of a bridge, or a growing population and fixed amount of roadway capacity. Whatever the context and reason, congestion charges work by signaling to drivers that there is a price to using their car in a crowded space at a crowded time. This encourages travelers to drive at different times, carpool, take transit, combine trips or forgo trips altogether.

The following recommendations would apply to vehicles of all kinds now and into the future — personal cars, autonomous vehicles, transportation network companies (TNCs) like Uber and Lyft, delivery trucks and more. These recommendations could be used alone or in combination to tackle congestion when and where it becomes a problem. Defining measurable goals — such as speeds buses and cars can travel in busy areas — is key for getting congestion pricing right. These recommendations call for using existing prices and infrastructure (parking, express lanes and bridge tolls) to better manage congestion, as well as trail-blazing policies such as congestion charging in downtown San Francisco and all-lane tolling where it may be needed in the decades to come.

Recommendation 8

Establish discounts for off-peak parking

Who's responsible: *Cities*

Once daily parking charges are in place for all public spaces (Recommendation 1), parking rates can be discounted for drivers who show up or leave outside of rush hours. For example, cities could standardize a \$2 discount for drivers entering garages and lots before 7 AM and/or leaving after 7 PM (for a maximum discount of \$4 per day). Parking operators could continue to set their own rates while such discounts could be standardized across a city for simplicity and predictability for drivers. Cities could annually review the hours the discounts apply, the minimum length of stay required and the discount amount to ensure the prices are effectively minimizing congestion and that the policy is fair across parking providers.

Recommendation 9

Implement congestion pricing in downtown San Francisco

Who’s responsible: SFCTA, state legislators

Congestion charges have been put in place in central business districts around the world to manage traffic and to encourage alternatives to driving alone. They have achieved large reductions in vehicle trips, emissions and travel times, as summarized in Figure 10 below.

FIGURE 10

Downtown Congestion Charges Save People Time, Clean the Air and Generate Revenue

The five cities in this table have instituted congestion pricing policies. All except Singapore require motorists to pay a scheduled charge to enter a designated area. Singapore uses variable rates to dynamically mitigate congestion. Stockholm, London and Milan have additional regulations for more polluting cars, called low-emissions zones.

	STOCKHOLM	LONDON	SINGAPORE	MILAN	GOTHENBURG
Vehicle trip reduction	22%	16%	44% at onset (1974), 15% more with new technology (1998)	34%	12%
CO ₂ reduction	14%	17%	15%	22%	2.5%
Travel time reduction	33% reduction in delays	30% reduction in delays	NA: Prices adjust to ensure consistent speeds	30% reduction in delays	10-20% faster speeds along corridors
Net annual revenue	\$150M	\$230M	\$100M	\$20M	\$90M

Enacting a downtown congestion charge in San Francisco would allow policymakers to tackle congestion that persists even in a global pandemic and recession⁸⁴ and that has gone unsolved despite innovative and deep investments in transit, bike and pedestrian infrastructure. Even the city’s transit-only lanes are clogged with traffic, lowering the value of these critical investments. There is simply not enough road space for all the drivers and their cars who want to be in downtown San Francisco at the same time. Part of this picture can be described with job numbers. No other Bay Area city comes close to the number or density of jobs: In 2017 San Francisco had over 715,000 jobs, while the next closest city had half that.⁸⁵ In addition, the average commuter to San Francisco lives roughly 38 miles away.⁸⁶ Because of this, congestion pricing in San Francisco is likely to have impacts far beyond its borders, including cleaner air and reduced travel times.

The SFCTA first released a comprehensive study of congestion pricing in 2010⁸⁷ and is studying congestion pricing again a decade later. The most promising design would charge drivers roughly \$10 to enter the northwest quadrant of the city during rush hours. An exemption for drivers with very low incomes is being discussed, as is a 50% discount for those with low incomes and other discounts for people with disabilities, bridge toll payers and people who live in the priced area. While the SFCTA is also investigating how to implement discounts for drivers with low incomes, it is important to note that most people driving into San Francisco during peak times make

84 SFCTA, “Mapping the Effects of Shelter-in-Place on Traffic Congestion,” May 29, 2020, <https://www.sfcta.org/blogs/mapping-effects-shelter-place-traffic-congestion> (accessed on August 12, 2020).

85 SPUR analysis of Longitudinal Employer Household Dynamics (LEHD) LODES data, Workplace Area Characteristics, 2017, <https://lehd.ces.census.gov/data/>

86 ibid.

87 SFCTA, “San Francisco Mobility, Access and Pricing Study,” 2010, https://www.sfcta.org/sites/default/files/2019-11/MAFS_study_final_lo_res.pdf

over \$100,000.⁸⁸ In addition, the SFCTA is planning for a 20-25% increase in bus service as part of the policy and has stated a clear policy goal of using congestion pricing to achieve a goal of reducing traffic by 15% from 2019 levels.⁸⁹ This kind of clarity allows for monitoring and adjusting the policy in periods when congestion is not a problem.

While the SFCTA's final report and recommended next steps for congestion pricing are due in 2021, SPUR supports the implementation of congestion pricing. It is a sound way to tackle congestion and the loss of time, lives, safety, emissions and noise that come with it. In addition, the clarity of SFCTA's goal as well as the equity focus can serve as examples for other cities pursuing congestion pricing.⁹⁰

Recommendation 10

Improve enforcement of occupancy and other rules in managed lanes

Who's responsible: *California Highway Patrol, Caltrans headquarters and District 4, MTC, Santa Clara Valley Transportation Authority (VTA), Alameda County Transportation Authority (ACTC), Bay Area Toll Authority (BATA)*

The Bay Area has invested millions of dollars and countless hours of expertise in designing, building and operating managed lanes. These include the region's extensive express lane network that is partially operational now and will stretch over 600 miles when fully complete in 2035. Express lanes are dedicated lanes that bypass traffic. Carpools and transit can access them free of charge and solo drivers can pay to use them. Managed lanes also include unpriced high-occupancy vehicle (HOV) lanes. All managed lanes have the potential to save time for people who share rides. The last report on Bay Area managed lanes showed that while the region's managed lanes hosted only 20% of vehicles on highways, they moved 33% of the people.⁹¹

While our managed lanes are working to prioritize shared rides, and reduce congestion on highways, more work is needed to ensure the region is getting the most out of them, and that they meet their goal of being "free-flowing" at 45 miles per hour. This includes better enforcement of occupancy levels (that is, number of passengers), increasing occupancy levels if needed and reconsidering free access for clean air vehicles.

Enforcement needs to be automated and privacy protections put in place

The Bay Area is grappling with how to catch drivers who violate managed lanes rules. These are solo drivers who bypass traffic by using HOV lanes or use express lanes without paying tolls or having the minimum number of passengers. In the morning peak as many as 40% of vehicles crossing the Bay Bridge and going south on 280 in managed lanes are cheating. In more than a third of the managed lane segments measured, 25% of vehicles are violating rules during peak periods.⁹² Not only does this slow down the lanes, it erodes trust in the system and encourages more drivers to ignore the rules.

After additional patrol personnel did little to address violation rates, MTC ran pilots to test the use of

88 SFCTA, "How might congestion pricing advance equity in San Francisco?" February 13, 2020, <https://www.sfcta.org/sites/default/files/2020-02/Briefing%20Paper%203%20-%20Equity%20200213.pdf>

89 See: SFCTA, "Downtown Congestion Pricing."

90 Other examples of local congestion pricing considerations in the Bay Area include East Palo Alto, where city councilmembers have discussed tolling University Avenue, a local chokepoint caused by people who neither live nor work in East Palo Alto but commute to tech campuses in Menlo Park. See: Emily Mibach, "East Palo Alto looking into making University Avenue a toll road," Daily Post, October 21, 2019, <https://pdailypost.com/2019/10/21/east-palo-alto-looking-into-making-university-avenue-a-toll-road/>

91 Caltrans, "District 4 Managed Lanes Report," 2018, pages 34 - 35.

92 Caltrans, "District 4 Managed Lanes Report," 2018, Pages 43 - 44.

cameras to automate enforcement.⁹³ Much like traffic light cameras, these would snap pictures of cars and license plates and mail violators a ticket. The major concern with this technique has been privacy, as pictures that capture the number of people in the car would be needed. The cameras MTC is considering do not include face recognition software, and violation summaries and plate numbers could be sent from the cameras without images to protect privacy. Still, strong privacy protections would be needed, as once this kind of data exists it can be used for other purposes. In particular, with automated enforcement, Bay Area policymakers should be careful not to proliferate racial bias in any new enforcement techniques. They should adopt the ACLU's recommended protections for the use of automated license plate readers (ALPR) by law enforcement.

Summary of ACLU recommendations for law enforcement relying on ALPR⁹⁴

- Law enforcement should not use data from ALPR to *generate* reasonable suspicions.
- Records should be stored for days or weeks, not longer.
- Flagging data to store longer must meet strict standards.
- Only law enforcement agents with appropriate training should be able to access ALPR data.
- Drivers should be able to request access and see ALPR data stored about them.
- Law enforcement should not share ALPR data with outside companies or agencies unless they adhere to the same rules.
- Officers using ALPR data for warrants need to adhere to fact checking plate numbers and working with dispatch to confirm vehicle occupants are the registered owners before taking further action.
- Any entity that uses ALPR data should have to publicly report usage once per year.

Better enforcement of managed lanes — enforcement that is automated to meet the level of violators in the system and that protects privacy and does not propel racial bias — is needed. Without it, Bay Area drivers will lose faith in the managed lane system, the reward for sharing rides will erode and our regional investment in a managed lane network will not deliver on its promise.

Increasing occupancy if needed

In some places, the minimum occupancy for managed lanes is two people, and in other areas, it is three. If, after better enforcement is in place, segments of the managed lanes are still congested the majority of the time, policymakers should consider upping the minimum. The focus should be on the performance of the lane as opposed to standardizing occupancy rules.

Clean Air Vehicles

Encouraging a move away from gasoline-powered cars is fundamental to solving climate change, and policies that grant clean air vehicles free access to managed lanes have been the single biggest reason for some to buy one.⁹⁵ However, as clean air vehicles, including electric vehicles, make up a larger share of cars on the road, they can't continue to be exempt from managed lane rules. In fact, tolling authorities in Santa Clara and Alameda Counties may soon sunset their free access in order to keep managed lanes flowing. This should continue as Bay

⁹³ MTC and Bay Area Infrastructure Finance Authority, "MTC Express Lane Quarterly Report: 4th Quarter, October — December, 2018," Submitted February, 2019, Page 10, https://mtc.ca.gov/sites/default/files/BAIFA_EL_2018_Q4_Report.pdf

⁹⁴ ACLU, "You are Being Tracked: How License Plate Readers Are Being Used To Record Americans' Movements," July 2013, page 33, <https://www.aclu.org/files/assets/071613-aclu-alprreport-opt-v05.pdf>

⁹⁵ Tamara Sheldon and JR DeShazo, "How does the presence of HOV lanes affect plug-in electric vehicle adoption in California? A generalized propensity score approach," *Journal of Environmental Economics and Management*, Volume 85, September 2017, pages 146-170, <https://www.sciencedirect.com/science/article/abs/pii/S0095069616301589>

Area congestion management agencies (CMAs) find necessary. While CMAs can also consider having clean air vehicle drivers pay a discounted rate for express lanes, they should be mindful of the income disparities in their counties when designing rates, as clean air vehicles are often bought by higher-income households.

Recommendation 11

Adjust bridge tolls to manage congestion

Who's responsible: CMAs, MTC, BATA

Across the Bay Area, eight tolled bridges link residents with job centers and connect counties. These bridges are massive investments in our connectedness. They also all have tolls going in one direction, all of which were originally set up to pay back the bondholders who financed the bridges. The tolls on the seven state-owned bridges (the Golden Gate Bridge is owned and operated separately) now also include charges that help fund seismic retrofits on the bridges and investments in transit projects throughout the region. BATA, housed within MTC, operates and maintains these tolls and the FasTrak electronic payment system drivers use to pay tolls.

Our bridges are both a current asset and a source of future transportation assets because of the revenue they generate in tolls. But they can be even more. The price signals sent by their tolls can shape how people travel, and the costs that their travel imposes on others.

For example, in 2010 when the general tolls on the Bay Bridge went up by \$1 during rush hour and carpool tolls went from \$0 to \$2.50, travel times shrank by as much as 16 minutes in the approach to the toll plaza and the number of vehicles in the carpool lane dropped by 20%.⁹⁶ Other studies found that peak hour crossings decreased and shifted earlier and later.⁹⁷ The price signals and travel times created by bridge tolls help determine who travels across them, in what mode and when.

Because of this, there should be a regional framework for adjusting toll prices across the region, tied to defined goals around car congestion and the prioritization of transit and carpool. For simplicity, rates should adjust at only scheduled intervals (for example, every three months) and only within a defined dollar range. This approach could keep toll revenue predictable,⁹⁸ manage bridge congestion and encourage shared modes and transit. Defining the congestion thresholds for rate adjustments, as well as the changes and schedule for adjustments, would require further analysis.

⁹⁶ Barnes et al., "Impact of Peak and Off-Peak Tolls on Traffic in San Francisco–Oakland Bay Bridge Corridor in California," *Transportation Research Board*, Volume 2297, issue 1, January 2012, page(s) 73-79, <https://journals.sagepub.com/doi/abs/10.3141/2297-09>

⁹⁷ Kate Foreman, "Crossing the bridge: The effects of time-varying tolls on curbing congestion," *Transportation Research Part A: Policy and Practice*, Volume 92, October 2016, pages 76-94, <https://www.sciencedirect.com/science/article/abs/pii/S0965856416305845>

⁹⁸ This is especially important as voters recently approved and courts recently upheld an increase in bridge tolls of \$3 by 2035 to fund road and transit capital projects as well as ongoing transit operations. See: SPUR, "Measure 3 Bridge Toll: Bay Area Traffic Relief Plan," <https://www.spur.org/voter-guide/san-francisco-2018-06/measure-3-bridge-toll>

Recommendation 12

Create strategies for all-lane tolling on critically congested highways with transit alternatives

Who's responsible: Caltrans, Federal Highway Administration, CMAs, MTC, BATA

Certain corridors suffer from continual congestion during economic stability and growth, even though they are paralleled by meaningful passenger rail. These include I-101 and I-280 between San Francisco and San Jose, where Caltrain runs train service, and I-80 between the Bay Area and Sacramento, where Amtrak runs its Capital Corridor line. The reason more people don't take the transit alternatives on these corridors is likely cost: a one-way ticket on Caltrain costs as much as \$15 and as much as \$29 on Amtrak.⁹⁹ The transit trips are also more time consuming if the trip origin and/or destination are not very close to stations.

However, as the population continues to grow over the coming decades, our region faces the critical challenge of how to manage the capacity of these corridors. MTC's modeling of potential future transportation investments finds that tolling is the most effective way to manage freeway congestion, and that without means based rates, it will worsen inequality.¹⁰⁰ Highway congestion could also be monitored and rate adjustments made to ensure that the region charges as little as possible to manage capacity. These practices could help encourage carpooling, transit trips and off-peak travel. All of these changes could help people get to their destinations more quickly, reduce emissions and improve safety. Depending on the costs of new tolling infrastructure, enforcement and customer service, revenue could be left over to increase transit service in the corridor and improve connections between stations and the beginning and ending places of trips. It will be important to have means-based rates and to allocate a portion of net revenue for this.

There are very few examples of implementing all-lane tolling on existing roadways, and the legal pathway is complex. For example, federal law stipulates that new lanes added to a federal highway can be tolled and existing high-occupancy vehicle (HOV) lanes can be tolled, but it is illegal to toll existing regular lanes.¹⁰¹ One potential legal avenue to all-lane tolling of existing roads can be seen in Oregon's ongoing efforts to manage congestion in the Portland metro area with all-lane tolling on I-5 and I-205.¹⁰² The process for adding all-lane peak period tolling on these interstates takes many years and includes many steps. The legal part of the process involves getting approval from the Federal Highway Administration, which has special authority to approve interstate tolling under the Value Pricing Pilot Program.¹⁰³

It is important to note that express lanes are planned along the peninsula corridor and I-80 between the Bay Area and Sacramento.¹⁰⁴ These express lanes give high-occupancy vehicles free access and solo drivers paid access to drive in a free-flowing lane during congested times. They will give drivers the option to pay or not and will familiarize more people with the idea of highway user charges. In addition, in the years to come, express lanes may not always be able to address the overall level of congestion in these corridors. All-lane tolling is the next step to decongest freeways and give people back time, cleaner air and improved road safety.

99 These prices assume a six-zone, adult, paper fare on Caltrain and a one-way ticket from Sacramento to Emeryville or Jack London Square in Oakland.

100 Anup Tapase, "Horizon / Plan Bay Area 2050: Project Performance Findings," MTC/ABAG, January 2020, slide 16, https://www.planbayarea.org/sites/default/files/pdfs_referenced/ProjectPerformance_FinalFindings_Jan2020.pdf

101 US Code Title 23 on Highways, sections 129 and 166 respectively, <https://www.law.cornell.edu/uscode/text/23>

102 See: Oregon Department of Transportation, "Oregon Toll Program," <https://www.oregon.gov/odot/tolling/Pages/default.aspx> (accessed on August 20, 2020).

103 See: US Department of Transportation, Federal Highway Administration, "Value Pricing Pilot Program," https://ops.fhwa.dot.gov/congestionpricing/value_pricing/ (accessed on July 25, 2020).

104 MTC, "Bay Area Express Lanes: I-880 Express Lanes" Fall 2018, <http://files.mtc.ca.gov/library/pub/31694.pdf>

Strategy 4

Establish Pay-As-You-Go Road User Charges

Under road user charges (RUCs), drivers pay a penny or two for each mile they drive. RUCs are typically seen as a replacement for the gas tax as opposed to an additional charge on driving. They work by tallying the amount of miles per driver, in either low-tech options like manual odometer readings or high-tech options like smartphone apps or telematics (in-car devices that track and transmit data about car use or maintenance needs). These tallies are then reported to a billing agency that handles collections and deposits revenue into funds to be spent later.

RUCs are promising replacements to the gas taxes that drivers pay each time they fill up their tank, and have been piloted in nine states, including California. In fact, coordination and peer exchange on RUCs is taking place through both the Western Road User Charge Consortium (13 states in the West) and the I-95 Corridor Coalition (every state along the Eastern Seaboard).¹⁰⁵ Oregon and New Zealand currently have active RUCs for passenger cars, and Germany, Austria and Switzerland have RUCs for trucks.¹⁰⁶ Our region and state should continue to help develop and implement RUCs as a replacement to our state and local gas taxes for many reasons.

Reasons to develop and implement road user charges (RUCs):

RUCs can provide sustainable road revenue for all kinds of modes. Replacing gas taxes with RUCs has gained attention across the US as passenger vehicles have become more fuel efficient and use less gasoline, meaning dwindling gas tax revenue (see Figure 5). In California and especially the Bay Area, adoption of electric and hybrid cars is high, making the funding challenge even starker. Even with the 2017 gas tax increase, the state still faces funding shortfalls as we meet California's ambitious vehicle decarbonization goals.¹⁰⁷ We need to fundamentally change the way we fund roads across the region and state.

Other gas tax replacements are problematic. Without a switch to RUCs, we will find ourselves at odds with other policy goals. For example, state policymakers approved an additional registration fee for electric and other zero emission vehicles as part of SB 1, even though the state subsidizes the purchase of such vehicles to advance public health and climate goals. Some estimate that the new fees may reduce the sales of less-polluting vehicles by as much as 20%,¹⁰⁸ and such one-time fees are particularly hard for households on tighter budgets. Local governments will have to pass sales taxes to repair and maintain roads, even though some people who pay sales taxes don't drive at all. Because there is a limit to how much revenue cities and counties can raise through sales taxes, it will pressure policymakers and residents to choose between roads and other public goods like affordable housing and educational facilities.

RUCs send the right signal to drivers. RUCs are uniquely suited to charge drivers only for the driving they do, and to save them money on the driving they don't do. This gives the right incentive to drivers because the more driving everyone does, the worse it is for others in the form of traffic, noise, emissions

105 See: The National Conference of State Legislatures, "Road User Charges (RUC)," <https://www.ncsl.org/research/transportation/road-use-charges.aspx> (accessed on June 10, 2020).

106 Robert S. Kirk and Marc Levinson, "Mileage-Based Road User Charges," *Transportation Research Board*, 2016, <https://trid.trb.org/view/1633477>

107 A. Fowler, H. Chong and P. Breslin, "The Road Ahead for Zero-Emission Vehicles in California: Market Trends and Policy Analysis," *Next10*, June 2019, <https://www.next10.org/sites/default/files/2019-06/ca-zev-brief.pdf>

108 Alan Jenn, "Assessing Alternatives to California's Electric Vehicle Registration Fee," Institute of Transportation Studies, UC Davis, December 2018, <https://escholarship.org/uc/item/62f72449>

and safety threats. Simulations of a 3.3 cent per mile RUC in Nevada predicted a 3 to 4% decrease in vehicle miles traveled (VMT),¹⁰⁹ while a much bigger RUC of almost 15 cents per mile reduced VMT in a DC metro simulation by 19%, mostly through mode shift to transit.¹¹⁰ Lowering VMT also carries the added benefit of reducing the road wear and the cost of repairing roads. Importantly, for RUCs to help shift behavior and encourage less driving, the prices paid will need to be visible to drivers each day, or even each trip.

RUCs could support other policies. RUCs apply to any public road at any time and can be adapted to meet different policy goals. This could provide a flexible and adaptive policy tool unlike any we have today. For example, the baseline rate of an RUC can be discounted for lower-income drivers. Discounts could also be offered for lighter, cleaner vehicles to help improve health outcomes in neighborhoods near freeways and busy roads. If enough people use location-aware technology, local jurisdictions can levy mileage-based charges to meet policy goals like decongesting busy downtowns. For future AVs, RUCs should be used to help ensure such technological changes don't leave us with worse congestion and poorer air quality and equity outcomes in the decades to come.

As long as charges are visible to drivers, RUCs show tremendous potential to help policymakers reduce overall VMT — and the emissions, fatalities and traffic that come with it — as well as to more equitably fund roads and advance transportation pricing platforms. However, even in their simplest form, RUCs will take sustained work to develop and implement. To pair RUCs with other policies such as local congestion charges will require additional effort. Thankfully, the California Road Charge pilot, recently conducted with more than 5,000 drivers, clarifies sticking points and offers a stepping stone to the next phase of RUC development.¹¹¹ Figure 11 summarizes some of the key challenges and possible solutions to RUC development that arose from the pilot.

109 A. Paz et al., "Assessment of Economic Impacts of Vehicle Miles Traveled Fee for Passenger Vehicles in Nevada," *Transportation Research Board*, 2014, <https://pdfs.semanticscholar.org/4a27/00bf9bcc63760bba23562329fcf256ac328e.pdf>

110 Elena Safirova, Sebastien Houde and Winston Harrington, "Marginal Social Cost Pricing on a Transportation Network: A Comparison of Second-Best Policies," Resources for the Future Discussion Paper 07-52, December 2007, <https://media.rff.org/archive/files/sharepoint/WorkImages/Download/RFF-DP-07-52.pdf>

111 See: Caltrans, "2017 Road Charge Pilot," <https://dot.ca.gov/programs/road-charge/final-report> (accessed on July 25, 2020).

Figure 11. Key Challenges to Road User Charge Implementation and Potential Solutions

This table summarizes key challenges and possible solutions to RUC development identified through the California Road Charge Pilot.¹¹²

KEY CHALLENGE	POTENTIAL SOLUTION
Privacy and data need protection. While data on miles driven in different places can be anonymized and protected, additional privacy protections and data security measures are needed. Drivers need to have confidence in these systems.	Drivers should have the option to choose reporting methods that do not track their location. Laws that establish RUCs can also mandate legal protection for personal information, and can codify drivers' privacy rights. For data security, financial-grade protections such as authorization, authentication and encryption should be employed.
RUCs are administratively complex and expensive to operate. The state gas tax is currently levied at a handful of gas distributors, which then pass it on to drivers at the pump. Collecting it from distributors costs less than 1% of gas tax revenue. An RUC would require billing for the state's 27 million drivers ¹¹³ and is estimated to cost 5-10% of revenues (though that could decrease over time).	To save costs, state transportation agencies can certify private companies to handle driver billing and customer service. This costs less because companies specialize in customer service and value-added products and are well suited to scale to millions of users. Allowing an open market for such commercial partners will encourage competition and lower costs. Lastly, smartphone apps and in-car technology to automate billing would cost less than mailing bills.
Adding local policies to RUCs will require planning. Counties and cities may want to add mileage- or location-based charges over time, a key potential benefit of RUCs. But this will require many kinds of coordination, as well as piloting, testing and iteration.	The state legislature will need to codify how local governments can adjust RUC rates to serve policy goals like congestion pricing, as well as ensure that the statewide RUC has an open payment platform and flexible technology options that can enable such partnerships. Metropolitan planning organizations could serve as a coordinating body to harmonize state and local prices within the RUC.
Compliance and enforcement are untested. The California pilot used mock payments and did not test enforcement. Some drivers may tamper with odometer readings, plug-in devices in car computers or even telematics.	Further piloting and testing is needed to identify, design and test suitable enforcement strategies.
Using revenues to address equity will take work. Some people are concerned that RUCs penalize rural drivers, long-distance commuters and drivers with lower incomes. Community groups and policymakers will have to navigate what discounts would be equitable and fair to address these concerns.	Foregrounding equity in pricing policies and discount decisions is essential. Research for the California pilot found that rural and lower-income drivers often drive less fuel-efficient cars and thus already pay a higher share of gas tax. Ensuring lower RUC rates for drivers with less means would be better, as would further engagement with drivers of different race/ethnicity, income, ability and geographic backgrounds.

Recommendation 13

Pass statewide legislation to further study, pilot and phase in road user charges to replace the state gas tax

Who's responsible: State legislators, California Transportation Commission, California State Transportation Agency, Caltrans, Department of Motor Vehicles, California Highway Patrol

In order to advance the promising work done in the California Road Charge Pilot, create stable funding for our transportation infrastructure into the future and eventually streamline all pricing policies into a single RUC platform, Bay Area advocates should design and push for state legislation that enables further work on RUCs.

The legislation should have at least the following elements (many of these points are based on the findings in the California Road Charge Pilot Program Final Report):

¹¹² CalSTA, "California Road Charge Pilot Program: Final Report," 2017, Sections VII and VIII, <https://dot.ca.gov/-/media/dot-media/programs/road-charge/documents/rcpp-final-report-a11y.pdf>

¹¹³ See: Statista, "Total number of licensed drivers in the U.S. in 2018, by state," <https://www.statista.com/statistics/198029/total-number-of-us-licensed-drivers-by-state/> (accessed on July 25, 2020).



Establish an organizational structure. The legislation should enable the Road Charge Technical Advisory Committee (TAC),¹¹⁴ in consultation with the California Department of Transportation (Caltrans) and the California State Transportation Agency (CalSTA) to finalize a model for how various state agencies work together to administer the various aspects of a RUC — from the management of third party vendors that provide billing and customer service to drivers to enforcement, the managing of revenue funds and more.

Standardize data collection and privacy protections. The legislation should also task the Road Charge TAC in consultation with Caltrans and CalSTA with coming up with a standardized method for collecting data on how many miles drivers went and where, as well as the transfer of data from vehicles and smart phone apps to third party billing and payment processing agents. As part of this, it should also include strong personal data privacy and data security provisions, including any applicable recommendations forwarded by the ACLU in Recommendation 11.

Require that new cars have RUC-ready technology. The legislation should also include a requirement that for a future model year, all vehicles sold in California have a minimum level of telematics technology that could be linked to a future RUC. This would bring down the RUC administration cost over time as the statewide fleet eventually turns over. The exact type of telematics technology should be flexible. Lawmakers should establish a technology advisory group to ensure that technology standards allow for adaptable hardware, software and protocols over time. In addition, even with telematics in vehicles, drivers should still be able to opt out of using them to comply with the RUC.

Allow volunteers to pay the RUC before a mandatory roll-out. To begin the transition to RUCs, the statewide legislation should also create the opportunity for any driver to voluntarily pay an RUC in lieu of the gas tax, the same way that Oregon does through its OReGo program. This can help administrators further test and refine mileage tracking, billing, payment and enforcement systems before any mandatory roll-out, especially as the pilot did not use real payments or test enforcement. After a voluntary program is in place, advocates should engage key stakeholders, including elected officials, drivers from marginalized communities and long-distance drivers, to be early volunteers.¹¹⁵ The legislation should establish a process to gather feedback from these and other volunteers to inform ongoing policy design.

Replace registration fees for zero-emissions vehicles with an RUC. Replacing annual registration fees for zero-emissions vehicles (ZEVs) with an RUC can serve as another controlled way to scale RUC adoption as well as remove an annual fee that is likely a deterrent to ZEV purchases.¹¹⁶

Commission a study on how to phase in mandatory RUCs. The legislation should also commission a study to advise on a schedule for transitioning more of California's cars away from the gas tax and onto the RUC. For example, newer cars could be required to pay the RUC, as could cars over a certain fuel economy, cars over a certain weight, or a combination of these. In addition, the study should model

¹¹⁴ The Road Charge TAC was created by state law (SB 1077 in 2014 and SB 1328 in 2017) and is a committee of industry experts. The TAC functions much like a sub-committee of the California Transportation Commission.

¹¹⁵ Paul Sorensen, Liisa Ecola and Martin Wachs, "Mileage-Based User Fees for Transportation Funding: A Primer for State and Local Decisionmakers," RAND Corporation, 2012, page 24, <https://www.rand.org/pubs/tools/TL104.html>

¹¹⁶ Alan Jenn, "Assessing Alternatives to California's Electric Vehicle Registration Fee"

the revenue implications of different per-mile RUC rates for each phase-in scenario, as well as the cost implications of each scenario for different populations including drivers with low incomes, drivers in disadvantaged communities, rural drivers and drivers of different abilities. Interviews and outreach to such populations should also be included.

Allow for pilots to coordinate RUCs with other pricing policies. The legislation should allow for pilots that combine RUCs and other tolls into one payment platform for users. This would mean offering users phone-based or in-car software that streamlines payments, as well as working out the back-end systems for collecting and reallocating revenue back to the state (for RUC charges) and local jurisdictions (for bridge and other tolls and parking).

Strategy 5

Pioneer New Pricing Policies and an Interoperable Payment Platform

Prices have the power to communicate a powerful message. The previous recommendations focus on the ways pricing can limit drive-alone trips across different geographies, with different kinds of infrastructure and parking amenities and at different times. These next recommendations highlight two additional opportunities — to use pricing to discourage driving during our region’s most polluted days, and as part of an interoperable platform where the relative pricing of driving and its alternatives can help shape the modes people choose.

Recommendation 14

Link Spare the Air days to regional pricing policies

Who’s responsible: BAAQMD, BATA, state legislators

BAAQMD alerts the public when its forecasts predict unhealthy air, the most extreme examples of which have happened in the past few years during wildfire season. On these “Spare the Air” days people are advised to drive less and avoid wood burning and other polluting activities. While some heed the advice, we could go further to ensure that all people, and especially those with heart and lung disease, are better protected on unhealthy air days. Parking or bridge tolls should increase throughout the region on these days in the near term. If and when a per-mile RUC is in place, the Spare the Air surcharge could instead be rolled into it. The RUC would ultimately be a good price to increase because it will address all miles traveled for all types of vehicles. However, zero emission vehicles could be exempt from any Spare the Air charges, and such charges could be withheld if wildfires prompt evacuations in the region.

Recommendation 15

Create an interoperable payment platform that travelers can use across all modes¹¹⁷

Who: MTC, BATA, Clipper Executive Board, CMAs, CalSTA

In the Bay Area, any one person may be a driver on Sunday, a transit rider on Monday and a pedestrian on Tuesday. Or they could be all three in one day, or even one trip. But this reality is not reflected in the way travelers pay for different trips. For example, FasTrak, an electronic payment device, can be used only on tolls in cars. Clipper, the Bay Area's electronic card payment system, can be used on transit, bikeshare and for parking at San Francisco Airport. Hailing a ride in Lyft and Uber requires payment by app. Cash and credit cards can be used in varying places. Checking and managing payments or balances on any of these requires logging in separately to various accounts.

Not only is this inconvenient, it makes it hard to understand the cost of a single trip by car (e.g. RUC payment plus parking and any tolls) or its alternatives (e.g. bus to train), as well as the difference between them. Pricing that aims to reduce drive-alone trips is most effective when the cost for each trip option is legible in a comparable way. A single, interoperable payment system across all forms of transportation could help. Such an interoperable payment platform is often called Mobility as a Service (MaaS). It's a software-based platform that gives travelers a single place to view all manner of transportation charges and fares, and plan, book, and pay for trips in a few clicks. It also has an "open" back-end that allows software developers to make easy-to-use apps and websites and banks, transit agencies and other transportation providers to receive payments for the portions of a trip they provide.

MaaS can help support pricing policies and encourage people to take alternatives to driving alone in additional ways. For example, it would make trips that involve transit transfers or transfers across modes more seamless for travelers. It could also help launch business ideas that require open payment software and that provide alternatives to driving alone. It could help people track and optimize their travel choices. In addition, interoperable pricing platforms allow policymakers to reward travelers with retail gift cards, loyalty points and other perks for choosing non-drive-alone options that are better for all of us. In other words, they allow for software-based TDM tools that would be easier and cheaper to scale across millions of people. An open payment platform is also foundational to being able to offer low-income households standardized subsidies or discounts across all modes in a cost-effective way — a move that could go a long way toward promoting equity.

An integrated transportation payment system requires toll authorities, transit agencies and others to receive payment differently than they do today. Payments made through a single platform will have to be routed to the proper agencies and companies quickly and reliably. This will be a big change, but it is fundamental for better mobility, more transparent transportation pricing, rewards and subsidies across modes, promoting affordability for people with low incomes and reducing the administrative costs of key pricing policies.

Creating a single payment platform would require the following components:

Develop a framework and strategy to guide the development of MaaS. MTC, the Clipper Executive Board and CalSTA would need to regularly bring together BATA, transit agencies and various companies across the private sector to work through where and how to develop MaaS and payment integration. The public sector's key role in developing successful MaaS platforms is to convene all of the transportation actors.

¹¹⁷ This recommendation borrows powerful ideas and builds off of SPUR's existing policies in *Seamless Transit*, and *Solving the Bay Area's Fare Policy Problem*.

Launch MaaS pilots. The government's role in launching pilots is to set guidelines and goals for the development of MaaS, and then solicit technology ideas from the private sector. Such pilots will enable policymakers to understand the regulations, protocols and technologies needed for MaaS, and for transit agencies, parking vendors and other transportation providers to better understand customer needs.

Steward the development of a digital platform. Mobility as a service requires a digital platform that combines trip planning, reserving rides, purchasing and payments across all public and private transportation modes. MTC should own a single platform and link it to Clipper and FasTrak. They should govern the rules and policies of the platform, including that travelers get clear notifications about the total cost of each trip option in a comparable way, every time they travel. At the same time, the platform would need to be made accessible to software developers and banks with open APIs. This would enable private sector innovation and increase the likelihood of user-friendly apps and websites. Such an open payment platform could also save costs on administering pricing policies by streamlining technology and electronic payments operations and customer service.¹¹⁸ From a traveler's perspective, all travel accounts would be combined — Clipper, FasTrak, a future RUC and more. Travelers would have a one-stop website and app to check all travel transactions. They would also have the ability to use a single payment card for every possible trip, including the one-tap bank cards that they may already use or may be popular with visitors. People without bank accounts could use their Clipper card on all transportation services by adding cash to their account at popular retailers such as mini-marts, pharmacies and grocery stores.

¹¹⁸ Paul Sorensen, Liisa Ecola and Martin Wachs, "Mileage-Based User Fees for Transportation Funding: A Primer for State and Local Decisionmakers," RAND Corporation, 2012, <https://www.rand.org/pubs/tools/TL104.html>

Conclusion

A People-First Future

Policymakers, drivers and communities across the Bay Area can decide to keep living with the many costs that driving alone brings — congestion and lost time, emissions, safety risks, noise, unsustainable revenues for basic infrastructure and heart and lung disease, particularly for our most vulnerable. All should look anew at how the cost of driving helps make this our status quo. Pricing policies have the potential to flip the script — as long as they are co-created with communities and mitigate inequities. Instead of giving cars free access to roads, pricing policies help guarantee free clean air to kids growing up near freeways, reliable commutes and more time at the end of the day, a more stable climate with fewer hazardous floods and fires, and quieter and safer streets. The investment in this future will require enduring political leadership and a combination of new parking policies, downtown area charges, toll adjustments, a replacement of the gas tax with a road user charge and open platforms for all types of transportation payments. It will require policymakers and administrators to reconcile pricing policies that don't serve this future. It will also require getting beyond policy silos and working across agencies and functions for this shared future. It will be a lot of work, but a future that values people over cars is well worth it.



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