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Increasing Mobility in Southern California: A New Approach

by Baruch Feigenbaum

The current lack of mobility in Southern California imposes significant costs on individuals, businesses, and the regional economy. The cost of congestion—as measured in wasted time and fuel—is estimated at $13.3 billion per year, or $1,711 per commuter annually. Average annual hours of delay per traveler have increased from 52 in 1985 to 80 in 2014. The travel time index (the ratio of travel time during peak periods to the same trip off-peak) increased from 1.31 to 1.43 during the same period.

In 2014, Los Angeles drivers spent an estimated 623 million person-hours sitting in congested traffic. Currently, it takes 43% longer to travel in Los Angeles during peak periods, when congestion is severe, than during off-peak hours. Researchers at the Texas A&M Transportation Institute (TTI) define this as a Travel Time Index of 1.43. Figure PS1 shows the trend in the Travel Time Index in Los Angeles over time, compared to the average of other very large urban areas (current regional population of over three million).

The region does not rank any better in other congestion measures. It is second worst in cumulative delay and delay per commuter. It has the highest commuter stress index and freeway planning index—the amount of buffer time that needs to be factored in due to the unpredictability of congestion—in the nation. Since gridlocked traffic uses more gasoline than traffic operating at free flow speeds, Southern California drivers waste almost 200 million gallons of gasoline each year, second worst in the country. Since the majority of Southern California transit users ride buses that encounter congestion on a daily basis, reducing congestion would make bus service faster and more reliable. As population and employment in the region continue to grow, these numbers will get even worse unless new measures to reduce congestion are implemented.

This is a policy summary of a more detailed policy study that is available at reason.org/

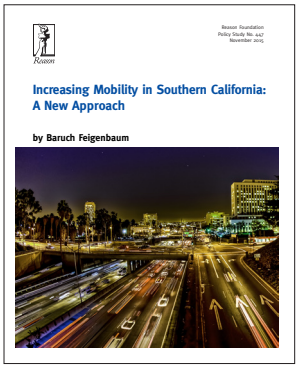

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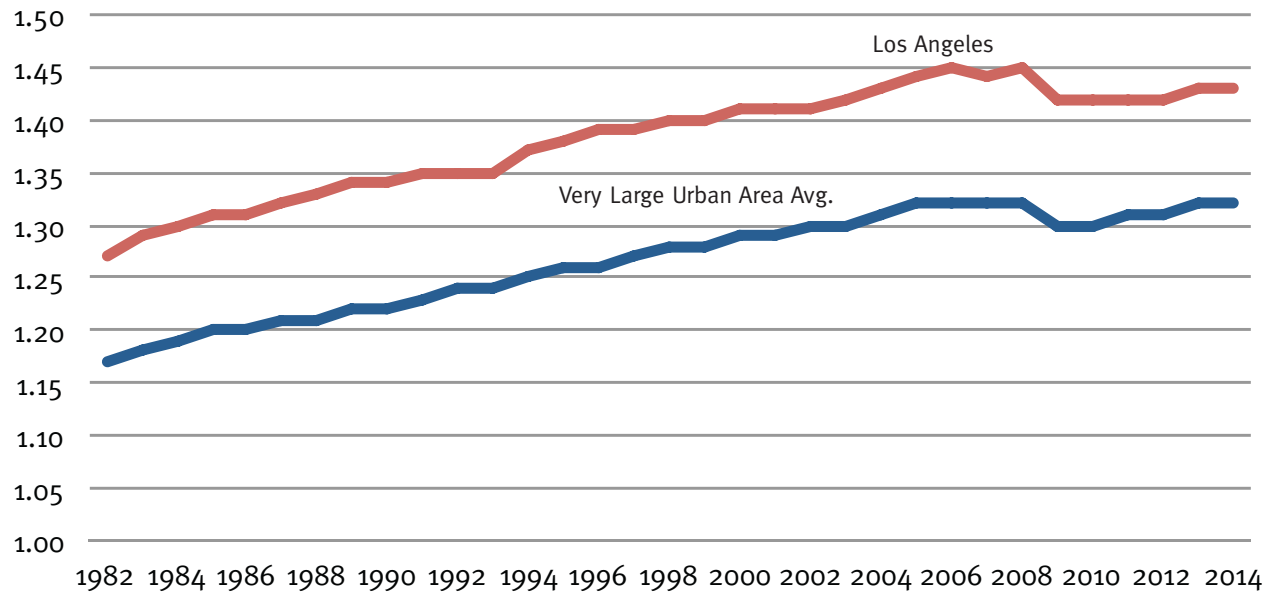
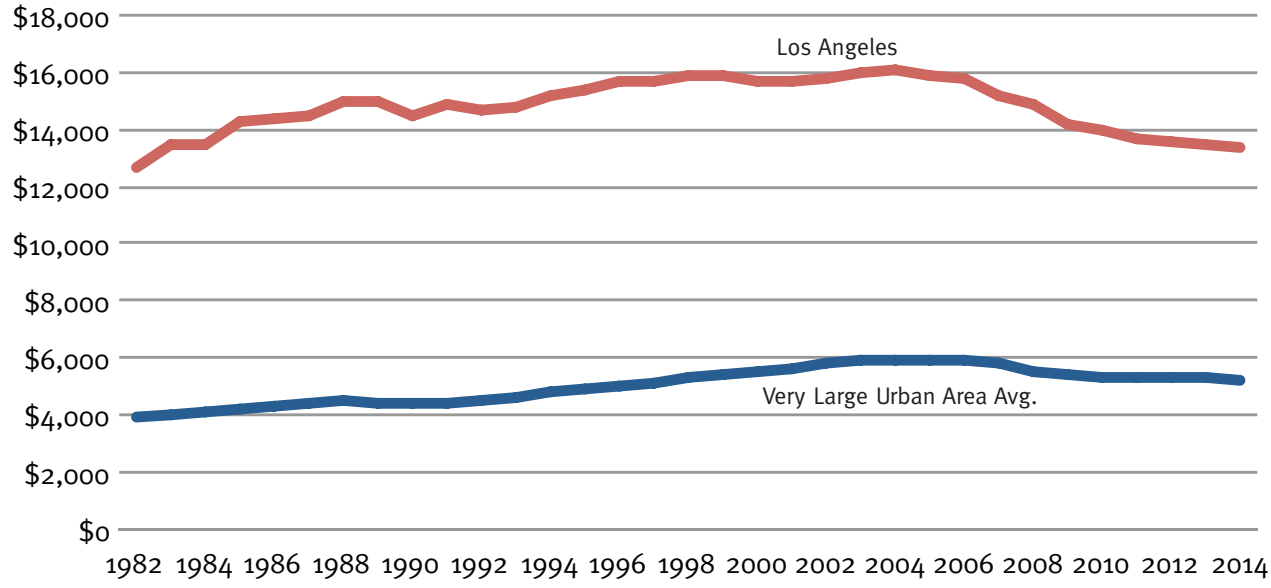
Figure PS1: Travel Time Index, Los Angeles Urban Area vs. Very Large Urban Area Average, 1982–2014



Source: 2012 Texas A&M Transportation Institute Urban Mobility Report, 2015; Texas A&M Transportation Institute Urban Mobility Report

Figure PS2 shows the trend in annual cost of congestion in Los Angeles over time, compared to the average of very large urban areas.

Figure PS2: Annual Cost of Congestion (millions) 1982–2014, Los Angeles Urban Area vs. Very Large Urban Area Average



Source: 2012 Texas A&M Transportation Institute Urban Mobility Report, 2015; Texas A&M Transportation Institute Urban Mobility Report

DEVELOPING A LONG RANGE PLAN THAT REDUCES CONGESTION

While the Southern California Association of Governments' (SCAG) Long Range Transportation Plan includes some new capacity, it does not allocate nearly enough resources to improving mobility. SCAG's current plans (particularly scenarios 3 and 4 in the matrix) represent one extreme approach to increasing mobility—attempting to drastically curtail the use of autos, trucks and buses by not expanding the expressways and further densifying land use. State regulations forced SCAG's plan to focus on reducing greenhouse gas (GHG) emissions, with much less consideration for transportation, economic or social equity concerns. There are other effective ways to reduce GHG emissions without inhibiting economic commerce.

Another approach that is just as problematic is adding extensive non-priced highway capacity throughout the region. Non-priced capacity improvements alone in populated regions cannot solve the problem of urban congestion. Experience suggests that new general lane capacity quickly fills up in growing metro areas, with previous congestion levels reasserting themselves five to 10 years after the non-priced capacity improvement project is completed. This phenomenon of highways becoming congested soon after they are widened is labeled "induced demand" and occurs for two reasons.

First, most metro areas are growing. While the new or expanded highway may have sufficient capacity for residents at the time it is completed, it does not have extra room for growth. A current example is the $1.1 billion project that added a single HOV lane (one-way) on I-405 through the Sepulveda Pass in 2014. Despite the added lane, Caltrans expects the southbound segment from US 101 to I-10 to be the most congested in the region as soon as the end of 2015. Most large-scale roadway expansions provide congestion relief in the short-term and possibly the medium-term (depending on how fast the region grows), but become congested again thereafter.

Second, residents often have unmet travel needs. Severe congestion may discourage consumers from eating at a restaurant or watching an L.A. Dodgers game at the stadium. But when congestion is reduced, these residents will make these trips. Infrastructure improvements that induce residents to make additional trips are good from an economic development perspective. However, they undermine congestion relief.

As such, adding large amounts of unpriced lanes is not the best solution to any urban area's transportation problems. While SCAG includes some additional general lane capacity, our plan includes none. General purpose widenings should be discouraged in the future.

OUR PROPOSED SOUTHERN CALIFORNIA MOBILITY STRATEGY

Since neither of the extremes is an effective long-term way to increase mobility, we have developed a middle ground that effectively increases mobility without increasing induced demand, adding greenhouse gases to the atmosphere, or creating other land-use and environmental concerns. As defined for purposes of this study, the Southern California urban area consists of Los Angeles and Orange Counties, as well as the western portions of Riverside and San Bernardino Counties and the eastern portions of Ventura County.

First, our plan will reduce congestion on expressways by establishing a region-wide network of roadways known as "express lanes"—dynamically priced, all-electronically tolled lanes that offer drivers fast, reliable travel times if they choose to pay for them. As some drivers choose to pay for faster travel times in the tolled lanes, congestion is relieved on non-tolled lanes as well. Many of these lanes will be new additions, as our plan does not convert existing general purpose lanes to express toll lanes, though it would convert existing HOV lanes to express toll lanes as a cost-effective way to build out the network.

Second, our plan will reduce congestion on Southern California's arterial network—a vital complement to the expressway system—by adding dynamically priced, all-electronically tolled underpasses at busy intersections. Arterials that have been improved in this way are known as "managed arterials" (analogous to electronic toll lanes on

expressways). These underpasses will allow buses and motorists to bypass signalized intersections, offering them faster and more-reliable travel times for those who choose to pay for them. These underpasses will also be new additions and may feature electronically priced bridges and/or tunnels. The plan would not force anyone to use these intersection bypass routes, but as some drivers choose to pay for faster travel times, more space is available for other drivers at non-tolled intersections, relieving congestion.

Third, our plan proposes filling in a number of key missing links in the overall expressway network, including the gap in the I-710 freeway in South Pasadena. All six of these projects would be financed in part via toll revenues, and all the new lanes would be electronically tolled.

Fourth, our plan advocates better operational management that makes use of intelligent transportation systems (ITS). These improvements build on our previous work by making the most efficient use of Southern California's roadway system through relatively inexpensive strategies, such as traffic signal optimization and ramp metering. Such improvements will also lessen non-recurrent congestion by reducing accidents, and ensuring those that do occur are cleared from the road in a timely manner.

Fifth, our plan improves transit by allowing buses to travel in the express lanes network free of charge, and our managed arterial network allows buses to use the tolled grade separations for free. Using these premium features will decrease the travel times and increase the reliability of BRT (bus rapid transit) and express bus. We also provide details on how to build on the success of the region's express bus network and L.A. Metro's BRT-lite system. Our plan uses existing local bus and limited-stop bus, complemented by bus rapid transit running on managed arterials and express bus running in express toll lanes on expressways. Combined with local bus, express bus and the existing rail options, the region can create a bus-based transit system with the quality, flexibility and coverage a rail-based system cannot provide. This kind of transit is vastly less expensive than heavy rail, light rail and commuter rail, because it uses infrastructure paid for largely by cars and trucks. Because of this much lower cost, the region will be able to build a comprehensive transit network many years sooner.

Sixth, our plan expands some inadequate expressway interchanges and rebuilds several functionally obsolete and structurally deficient interchanges. These investments will unclog some of the region's (and the country's) worst expressway bottlenecks.

From a revenue perspective, tolling—a major part of our plan—contributes significant resources to the biggest projects. Tolling would help build approximately 710 lane-miles of new expressway capacity, 3,475 new/converted lane-miles of express lanes, and 559 new managed grade separations. The tolled facilities will generate approximately $362 billion in toll revenue over the infrastructure's life cycle, providing more than 100% of the total revenue needed to build and operate the tolled components (new expressways/tunnels, express toll lanes and components, managed arterials and components), while providing a contingency in case costs are higher than forecast or revenue is lower. This approach assures commuters and other travelers of faster and more-reliable travel choices within a financially feasible and sustainable system.

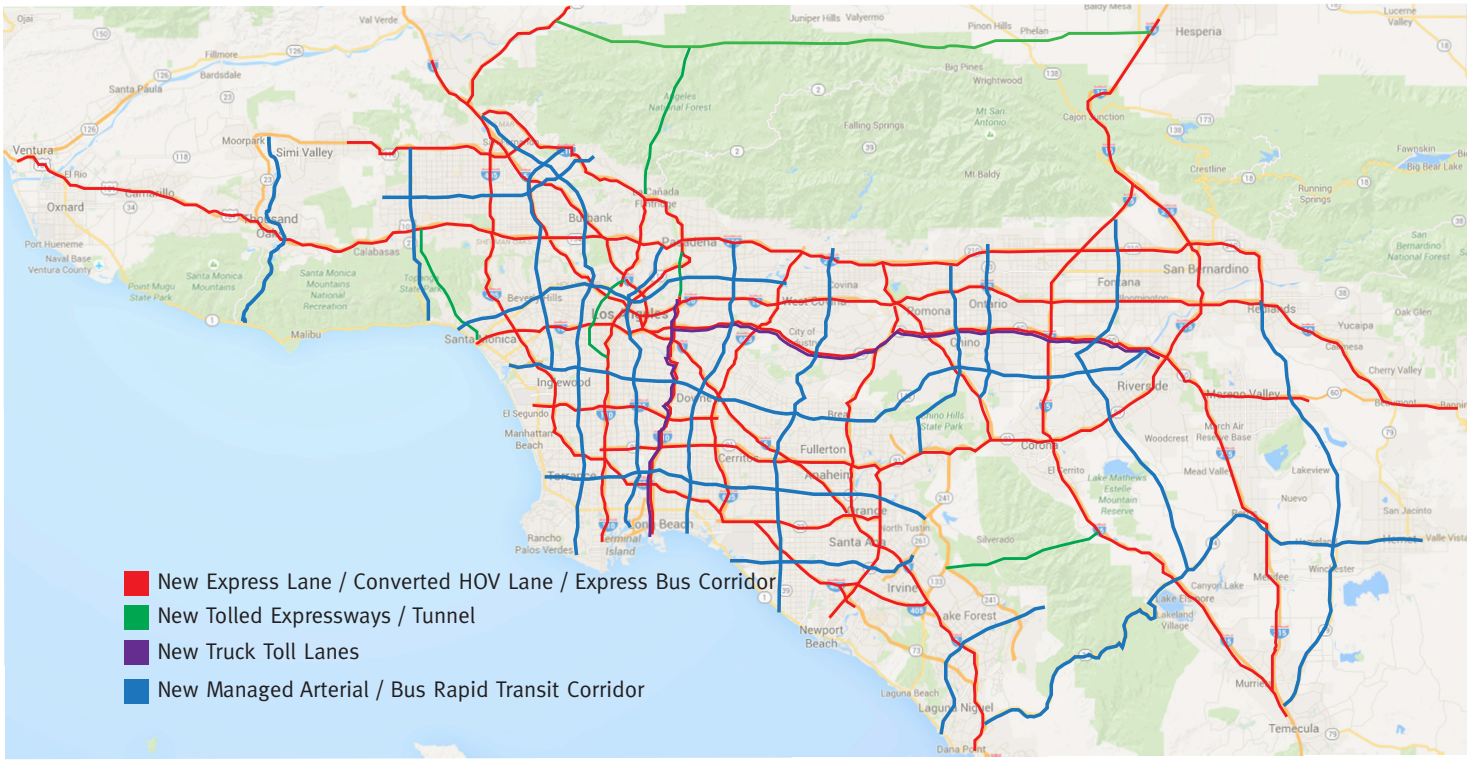
Our plan advocates many infrastructure improvements. Table PS1 lists our plan's major capital components and their anticipated costs in nominal (year of expenditure) dollars. Figure PS3 illustrates our plan's major projects.

The nominal (adjusted for inflation) cost of our plan is $714 billion. However, since our plan makes extensive use of tolling ($362 billion), our plan needs only $352 billion in taxpayer resources. As a result our plan can be constructed with current resources; no tax increase is needed. SCAG's plan needs to find an additional $254 billion over 25 years. Without a tax increase, our plan to use tolling supports more improvements than SCAG's plan with a tax increase.

To reduce the risks inherent in our tolling projects (express lanes, managed arterials, new toll expressways/tunnels), we recommend that they be carried out under long-term concession agreements in which the private sector partners would bear the risks of cost overruns and revenue shortfalls. Public private partnerships (P3s) of this scale are being successfully employed in Colorado, Florida, Texas, Virginia and around the world.

Table PS1: Reason's Plan for Southern California Region Congestion Relief	
Component	**Total Cost Year of Expenditure (nominal)**
New surface expressways/tunnels	$97.2B
Expressway interchanges reconfiguration	$4.1B
Arterial/local road capital	$74B
Arterial interchange reconstruction	$15.6B
Express toll lanes	$105.0B
Express toll lane interchanges	$24.0B
Managed arterials widening(s)	$16.5B
Managed arterials optional tolled grade separations	$33.7B
Managed arterials new alignments	$2.9B
Toll contingency	$32.5B
Transit capital/bus	$42.7B
Roadway operations and maintenance	$90.5B
Transit operations and maintenance	$102.4B
Intelligent transportation systems	$10B
Active transportation	$7.7B
Transportation demand management	$5.2B
Debt service	$50.1B
Total	**$714.1B**

Figure PS3: Map of Reason's Plan for Southern California Region Congestion Relief



1. Creating an Express Lanes Network

Southern California region has an extensive expressway network. Many expressways have 10 or more lanes, yet some roadways remain congested for eight or more hours per day. With a large and growing population, adding general purpose lanes to area expressways is unlikely to reduce congestion. Instead this study recommends adding variably priced toll lanes to every regional expressway. All express lanes will be converted HOV lanes or new lanes. No GP lanes will be converted to express lanes. Additionally, this study recommends adding truck toll lanes to select corridors with high truck volumes. Such an approach has two advantages:

- It maximizes vehicle throughput and congestion relief, by pricing lanes to manage congestion. Drivers who absolutely must reach their destinations on time have a means of doing so, which is currently not available.
- It generates part or all of the revenue needed to build and maintain the facility, making for an achievable and sustainable solution.

2. Creating a Managed Arterial Network

The same concept (using pricing to manage demand) inherent in express lanes on expressways can also be used on arterials. Arterials, which are the backbone of a region's road network, are higher-level roads designed to transport large numbers of vehicles long distances. Yet many arterials suffer from degraded service conditions with large delays, particularly at traffic signals. The managed arterial concept provides the option of paying a small toll ($0.15-$0.35) to use an underpass or overpass to bypass congestion at major cross streets. Travelers who choose not to pay a toll can continue to cross through the intersection at grade level. Managed arterials include a number of these grade separations to provide a fast, reliable option for commuters who need to reach their destination on time. Additionally, managed arterials generate part or all of the revenue needed to build and maintain the facility, making for a fiscally achievable solution.

3. Filling Gaps in the Current System

Solving Southern California's mobility problem involves providing long-needed missing links in the expressway system to reflect the actual land uses and travel patterns of the Southern California urban area. To help more effectively manage congestion, we recommend building the following six expressway projects:

- Project 1: I-710 Extension (I-710T): A tunnel that extends I-710 north from Southern California to connect with I-210 in Pasadena.
- Project 2: High Desert Corridor (HDC): A new expressway between SR 14 in Palmdale and I-15 in Victorville.
- Project 3: Glendale-Palmdale Tunnel (GPT): A tunnel extending north from SR 2 in the Glendale area and connecting with SR 14 just south of Palmdale.
- Project 4: Irvine-Corona Freeway (ICE): A new combination expressway corridor/tunnel between Riverside and Orange counties.
- Project 5: Cross Mountain Tunnel (XMT): A new combination expressway/tunnel connection between US 101 in the San Fernando Valley and I-10 in West Southern California.
- Project 6: Downtown Bypass Tunnel (DBT): A tunnel extension of SR 2 south through central Southern California to I-110.

The full study provides detailed feasibility data on construction, anticipated costs and revenue, and mitigation of traffic congestion, for these projects as well as for the express lane and managed lane networks. Implementing these projects would represent a huge, one-time catch-up in network capacity to better match the system's capacity to the growth in population and travel over the past 20 to 30 years during which capacity additions were limited.

4. Improving Transit

The free-flow conditions created by lanes in which volumes are managed by variable pricing (such as the express lanes and managed arterials networks described above) can also provide more-reliable roadway-based transit services. We propose getting double bang for the buck from the above-listed roadway projects by establishing a new, comprehensive network of express bus, bus rapid transit, limited-stop bus and local bus service across the Southern California metropolitan area. To make this feasible, our plan calls for replacing some planned rail lines with express bus and bus rapid transit lines.

Increased Reliability: Our variable priced lanes can keep traffic flowing at a high volume with no congestion. Therefore, a properly run priced lane can provide express buses with performance comparable to what they get from an exclusive busway. Because of this, some have termed a priced lane that provides guaranteed access for express bus/BRT service a "virtual exclusive busway" (VEB). VEBs have already been implemented in Southern California, for example, I-10 and I-110 have dynamically priced lanes that provide free passage to buses, vanpools and emergency vehicles, but charge a variable toll based on congestion to automobiles. In this way, the express lanes network creates free-flow conditions, increasing bus schedule reliability and providing the potential for more service, which makes transit attractive to car commuters.

Decreased Cost: The great advantage of a bus-based transit system of this sort is that for the cost of three new rail lines serving just a handful of commuter corridors, Southern California can create a comprehensive transit system for the *entire urban area*. What's more, this comprehensive system can be implemented over the lifetime of our plan—decades before a rail network would be completed.

Thus, the capital cost of a VEB network would be between one-sixth and one-fourth that of a rail system of comparable size (though that comparison does not include the cost of additional buses to make full use of the new network). Light or heavy rail capital costs—$30 to 40 billion—would all have to be raised as federal, state and local tax money. Passenger fares would not cover any of that, and would cover only a portion of the operating and maintenance costs. By contrast, the VEB network's capital costs would be partly covered by motorists paying the variable-priced tolls.

Increased Flexibility: Improving bus rather than rail lines enables all roadway improvement to also enhance transit, doubling the benefit. As peripheral roadways increase the reach of cities, buses allow for immediate, relatively inexpensive transit that flexes with route demand, unlike rail, which is fixed, prohibitively expensive and time-consuming to build.

Better Service: Providing high-quality bus service that mimics rail is key. Limited-stop bus services typically operate as "express bus" or "bus rapid transit." Express bus provides point-to-point service from outlying areas to downtown destinations and to major bus transfer hubs, and mainly operates on expressways or primary arterials during peak periods, making its service characteristics similar to commuter rail. Bus rapid transit (BRT) operates mainly on arterials, has frequent stops along the transit line (every ¼ to ½ mile) and serves multiple origin and destination pairs. Its service characteristics are similar to heavy or light rail. Bus service that diversifies to serve riders' needs has a greater chance of attracting drivers to switch to transit.

More Congestion Reduction: Even a small reduction in the number of vehicles on a stretch of roadway can have a big impact on congestion. By allowing for uncongested bus travel, express lanes are a true win/win proposition. They increase transit ridership in the corridor, which leads to reduced congestion by decreasing the number of vehicles on the road. Across the country managed lanes have increased the number of people taking bus transit and decreased the travel times.

We calculated potential ridership for eight BRT lines operating on managed arterials. Our calculations assume that Metro uses optional priced underpasses, uses priority traffic signals 18 hours a day, and implements off-board payment. Our findings show that managed arterials will increase current Santa Monica line ridership by 60%. Each of the eight lines would operate with at least 1,100 riders per mile, with some exceeding 3,000 riders per mile.

Southern California currently has more than 20 express bus lines, with most transit operators in the region operating at least one line. These ridership numbers would make Southern California BRT lines some of the most heavily used per mile in the country and set a new gold standard for bus service.

5. Using Operations Management Strategies

"Operations management" is the set of strategies used to maximize existing infrastructure to reduce congestion. It significantly improves mobility, typically at a very low cost. For example, the California DOT (Caltrans) estimated a package of system operations measures to have a cost-benefit ratio of 8.9 to 1. By contrast, the addition of conventional highway capacity had a benefit-cost ratio of 2.7 to 1. While both need to be completed, the low-hanging fruit is the system operations measures, which have the advantages of being (1) relatively inexpensive, and (2) implementable within a matter of years, rather than decades. Our plan calls for increased use of dynamic traffic management system data, ramp metering, variable speed limits, signal optimization, queue jumps and other "intelligent transportation systems" (ITS) to enhance mobility by increasing the number of cars a given stretch of pavement can accommodate.

Dynamic traffic management systems are cost-effective systems that improve traffic flow on expressways and arterials. They use simulation models combined with real-time traffic information to predict the effects of various management strategies. Route time, travel time and departure time are collected from sources of real-time information such as loop detectors, roadside sensors and GPS devices. This travel information is used to predict network flow patterns and travel times on routes, given the combination of management strategies used on those routes, including incident management, ramp metering, signal control and traveler information. Based on these predictions, the system selects optimal strategies and suggests travel time predictions and route recommendations to travelers. These programs have been successfully deployed in Europe and Japan resulting in capacity improvements on major freeway corridors of up to 30%, as well as significant increases in trip predictability and safety.

Intelligent transportation systems (ITS) are the most popular subset of dynamic traffic management systems. U.S. engineers have been implementing ITS for over two decades and have installed vehicle sensors and message signs, as well as backbone communications systems, on many major urban freeway corridors and selected arterial highways. These sensors gather data about traffic conditions on a 24/7 basis, and collect, compile and distribute that data to the motoring public in near-real time through a variety of public and private information channels. In a more proactive role, ITS could provide information, suggest alternate routes and indicate where to exit the highway to avoid congestion.

The California Department of Transportation (Caltrans) operates a partially dynamic traffic monitoring system called "Quickmap" that provides updated information on changeable travel signs. The website provides traffic cameras and information on travel alerts, weather, road conditions, speeds, roadwork, detours and information to truckers. Caltrans also has a mobile application for smart phones, but the agency could improve its service by providing real-time updates of incidents and severe congestion events. The state also uses other dynamic systems, such as converting a shoulder to a direct exit lane. However, the state needs to complete its transition from a static plan to a dynamic operations plan. Our plan recommends using the following dynamic systems to mitigate congestion:

- Ramp metering
- Queue warnings
- Speed harmonization
- Hard shoulder running
- Junction control
- Traffic signal optimization
- Queue jumps

The full study examines each of these strategies and their effects in detail. As mentioned previously, such intelligent transportation systems would also benefit all road-based transit, such as express bus and bus rapid transit.

COSTS

For the 2015 fiscal year the Southern California region will spend $9.1 billion on surface transportation. While SCAG is not able to build all of the necessary projects, we believe the answer is not more taxpayer funding but rather greater use of tolling, greater use of public-private partnerships (P3s), and separating the needs from the wants. By implementing these solutions, our plan is able to fund all of the region's needs without raising taxes.

1. Future Projections

Of the SCAG region's constrained spending (spending supported by current taxes and tolls), approximately 53% of the total comes from local sources, 25% comes from state sources and 22% comes from federal sources. SCAG also proposes a number of new potential revenue sources. While this revenue is assumed, it is by no means guaranteed. Any future revenue depends on the willingness of politicians and the taxpayers to implement new or different taxes and user fees.

There are several problems with such a funding strategy. First, before California looks for substantial new revenue or significantly increases taxes, the region should strive to maximize its existing resources. The state is continually ranked in the bottom in terms of highest cost per mile, highest salaries and reluctance to try innovative methods. Second, many of these new revenue sources are unlikely to come to fruition. For example, the federal government is unlikely to both increase the gas tax and enact a new freight fee. It is more likely to be one or the other. SCAG's plan's $254 billion shortfall assumes that all of these transportation tax increases will pass, which is exceedingly unlikely. In contrast, Reason's plan uses existing taxpayer revenue. Third, this strategy assumes that all of these new taxes will be added to existing taxes. The two national surface transportation financing commissions saw mileage-based user fees as a replacement for, not a supplement to, existing gas taxes. As a result, the SCAG expectation of an additional $254 billion appears extremely unrealistic.

There are significant differences between Reason's plan and SCAG's existing 2012 plan. Our Southern California Mobility plan, not including tolling, costs $714 billion (inflation-adjusted) over 25 years. However, since our plan features an extensive network of optional variably priced highway lanes and optional tolled grade separations to bypass the most congested surface street intersections, an additional $362 billion is provided through toll revenue. By using tolling to provide half of the plan's total funding, Reason's proposal is able to stretch limited taxpayer resources further and support approximately twice as much investment as SCAG's revenue-constrained plan. Our plan does not have to choose between roadways and transit. It is able to invest significant resources in both.

Reason's funding mechanisms are both more effective and more realistic from a political point of view. Our plan fully funds these improvements with existing resources. It does not require a tax increase. In fact, by using tolls the Reason plan provides more funding without a tax increase than SCAG's plan provides with a tax increase. And since managed lanes and particularly managed arterials traffic forecasts can be challenging to predict, the Reason plan includes a large contingency in case actual traffic counts are lower than projections. By including the congestion reduction components of the SCAG plan, prioritizing the construction of a complete transit network, and including additional projects that reduce congestion, our plan more effectively increases mobility. Table PS2 below compares Reason's plan with SCAG's plan over the 25-year timeframe.

The Reason plan presents a fiscally conservative method of supporting transportation infrastructure improvements, using tolling to stretch resources further. Combining tolling with existing revenue, our plan provides more resources without a tax increase than SCAG's plan does if all the tax increases are approved, which is not a given.

Table PS2: Reason's Plan versus SCAG's Plan Total Funding (nominal dollars)		
Category	**Reason**	**SCAG**
Roadway Capital Projects (Expressway, Arterial and Local non-tolling)	$93.7B	$102.7B
Toll Projects	$279.3B	$55.6B
Contingency	$32.5B	$0
Transit Capital Projects	$42.7B	$123.3B
Intelligent Transportation Systems	$10.0B	$8.8B
Active Transportation	$7.7B	$7.7B
Transportation Demand Management	$5.2B	$5.2B
Roadway Operations and Maintenance	$90.5B	$89.5B
Transit Operations and Maintenance	$102.4B	$160.7B
Debt Service	$50.1B	$52.0B
Total	**$714.1B**	**$605.5B**

*Uses SCAG's projected revenue with tax increases

CONCLUSION

With a lack of mobility remaining Southern California's largest transportation problem, the region's productivity, economic base and quality of life are threatened by a poorly functioning transportation system. Implementing the current SCAG LRP will lead to a future of higher taxes with little relief from congestion. SCAG's plan would continue to spend large amounts of resources on rail transit while starving bus transit and only marginally increasing transit ridership. While the region continues to spend significant resources on new rail lines, Southern California region residents are taking fewer transit trips per capita today than 20 years ago. Transit-dependent residents must rely on a smaller bus network that fails to adequately serve their needs.

In contrast, we have proposed a comprehensive transportation system consisting of roadway and transit improvements that would reduce congestion and improve mobility far more effectively than the 2012 SCAG plan. Additionally, our plan fully funds these improvements with existing resources. It does not require tax increases. By including and supplementing the congestion reduction components of the SCAG plan and replacing the ineffective transit components with projects that cost-effectively improve transit service, our plan more effectively increases mobility.

Our plan, adjusted for inflation, costs $714 billion over 25 years. SCAG's plan, adjusted for inflation, costs $606 billion. While SCAG's plan requires significant new funding, our plan improves mobility by using tolling to provide almost half of all revenue and by focusing on needs, not wants. In fact, our plan provides more total revenue without a tax increase than SCAG's plan includes with a tax increase. Most significantly, our plan more effectively improves mobility for all transportation system users.

ABOUT THE AUTHOR

Baruch Feigenbaum is assistant director of transportation policy at Reason Foundation, a non-profit think tank advancing free minds and free markets. Feigenbaum has a diverse background researching and implementing transportation issues including public-private partnerships, highways, transit, high-speed rail, ports, intelligent transportation systems, land use, and local policymaking.

Feigenbaum is involved with various transportation organizations. He is a member of the Transportation Research Board Bus Transit Systems and Intelligent Transportation Systems Committees. He is Vice President of Membership for the Transportation and Research Forum Washington Chapter. Feigenbaum is also a member of the American Planning Association, Institute of Transportation Engineers, and Young Professionals in Transportation. He has appeared on NBC Nightly News and CNBC. His work has been featured in the *Washington Post* and *The Wall Street Journal*.