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2012 Organization of the Year

Research at the University of California Transportation Center

ACCESS 42 • SPRING 2013

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ACCESS Magazine reports on research at the University of California Transportation Center. The goal is to translate academic research into readable prose that is useful for policymakers and practitioners. Articles in ACCESS are intended to catapult academic research into debates about public policy, and convert knowledge into action.



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Getting on Board with Public Transit

THE ANCIENT GREEKS BELIEVED THAT THE recently deceased journeyed to the land of the dead not by floating toward a bright light, but by public transportation. A boat driver named Charon carried souls across the river Styx on an express ferry to Hades. The dead who didn't have exact change were forced to wander for thousands of years, looking for a deli where they could break a drachma.

To the ancient Greeks public transportation signified death, and it still does for some people today. Those who avoid public transit complain about the lack of convenience, comfort, and personal space. Even people who own a vehicle but still ride the bus say they do so to save money, to reduce their carbon footprint, or because they can't find their car keys. Few people talk about actually enjoying it.

A few years ago, I joined a motivational group that set monthly goals for self-improvement. Because we pursued each goal for only a month, we became fully immersed in the endeavor without being intimidated by a long-term commitment. Then, after the month was over, we hoped the goal would become a habit. One of my first goals was to practice more of what I preached with respect to environmental friendliness. So for one month I left the car at home and rode public transit.

The beginning was frustrating. I used to eat in my car as I drove to work, but passengers aren't allowed to eat on the bus. Instead of a door-to-door commute, I now had to plan more, walk more, and allocate more time to get to and from bus stops. Sometimes the bus would arrive so late that two would show up simultaneously; other times, the bus would be so crowded that there was barely enough room to stand. It was a challenging beginning that tempted me to quit. But after a few weeks, I began to see the hidden benefits.

Because I couldn't eat on the bus, I had to eat before I left for work, which forced me to slow down and enjoy the moment. In walking to and from bus stops, I expanded my circle of comfort and began to walk to more places each day, increasing my overall level of health. Most important, our solo car culture produces more than traffic—it also isolates us. On the bus, I met new people and heard interesting stories; I shared in laughing at the ridiculous things we all saw along the way; and I made some people's day by giving them my seat. On the bus, life happens.

Much like my adventures on public transit, I hope this edition of ACCESS brings you pleasant surprises and a new perspective.

In this issue, Alan Altshuler discusses High Occupancy Toll (HOT) lanes and the unique nature of equity debates in US surface transportation policy.

Michael Manville and Jonathan Williams investigate how disabled placard abuse increases traffic congestion and reduces public revenue.

Erick Guerra and Robert Cervero test whether a half-mile circle is the right scale for examining Transit-Oriented Development, or just an outdated rule of thumb.

Exploring the idea of TODs further, Anastasia Loukaitou-Sideris looks into the ambitions, influences, restrictions, and challenges of developing land next to transit stations.

Juan Matute covers the cross-boundary challenges in greenhouse gas management, and how local efforts might change the way Californians live and travel.

And finally, Donald Shoup shows how overnight parking permits might strengthen the argument for removing minimum parking requirements.

May you find a nice bus, rail, or ferry route on which to enjoy this issue.

John A. Mathews
Managing Editor



Equity as a Factor in Surface Transportation Politics

ALAN ALTSHULER

BY FAR THE LARGEST FEDERAL INFRASTRUCTURE GRANT PROGRAM IN THE UNITED STATES IS FOR highways and urban mass transportation, totaling \$60 billion in 2011 alone. Two of the three most recent multi-year authorizations for surface transportation programs, enacted in 1998 and 2005, featured *equity* in their formal titles. Many states argued that, to be equitable, federal highway aid should mirror revenue flows from each state into the federal Highway Trust Fund. In contrast, few argued for equity on behalf of the poor and disabled.

We are now in the midst of new debates about funding for surface transportation, and how to manage road congestion in an era when major capacity expansion is rarely feasible. These debates are also routinely framed around conceptions of equity. In this article, I seek to explain the distinctive nature of equity debates in US surface transportation, with particular attention to congestion pricing and High Occupancy Toll (HOT) lanes.

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CONCEPTS OF EQUITY

Equity encompasses the ideas of fairness and equality in some form—if not of incomes, then in relation to the law or access to public services. But the concept of equity is also exceedingly general, and every political group tends to claim its mantle, even when their aims are diametrically opposed.

I focus here on four operational definitions of equity, grouped into two sets that have been the most salient in recent surface transport deliberations (Table 1). Set 1, Redistributive Equity, involves variants on the theme that government action should seek to offset private sector inequalities. Set 2, Return-to-Source Equity, involves variants on the theme that benefits should flow to those who have paid for them.

Most successful equity claims in transportation policy are of the return-to-source variety. Consider the multi-year authorization statute enacted in 2005, known as SAFETEA-LU, the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users. The Act’s section on equity focused exclusively on guaranteeing that each state receive at least a 90 percent return (rising to 92 percent in 2008) of its contribution to the Highway Trust Fund.

Americans harbor very different conceptions of equity when thinking about the private and public sectors. In the private sector, they sharply distinguish equity from equality, viewing inequality as a vital incentive on which prosperity depends. In the public sector, by contrast, they are highly suspicious of privilege and believe that services >

THEME	VARIANTS
<p>Redistributive Government action should seek to offset private sector inequalities.</p>	<p>Fiscal Redistribution Defined here as transfers from more to less affluent groups, and at times special benefits for those with disabilities.</p> <p>Do No Harm Public initiatives should, insofar as possible, leave no one worse off.</p>
<p>Return-to-Source Public benefits should flow in proportion to fiscal contributions.</p>	<p>Fee-for-Service In the public realm, typically collective (calculated for groups, such as highway users, rather than individuals).</p> <p>Geographic Benefits should flow from higher to lower level governments in proportion to revenue flows from the lower to higher.</p>

TABLE 1
Equity Concepts

should be provided to the residents of any jurisdiction either equally (garbage collection, water supply) or on the basis of need (compensatory education, safety nets for the poor). For the most part, these attitudes about equity simply coexist. When they come into conflict, it is usually in the context of disputes about the appropriate scope of government.

In domains framed as economic (banking regulation, development tax incentives), overarching policies typically aim to help businesses flourish. In domains viewed as quintessentially public (government personnel policies, most social policies), egalitarian norms tend to predominate.

These are tendencies, to be sure, not absolute dichotomies. What is pertinent in the framework of this article, however, is that most transportation policies have been framed squarely as economic, with little or no focus on redistribution. There are some obvious reasons why. Most of the vehicles are privately owned and operated. The organizations that make, sell, fuel, and maintain them, and the organizations that use them for shipping, are almost all private. This pattern carries over into politics. Dominant interest groups—companies and their trade associations—have long framed the government’s role as mainly to facilitate private travel and investor-driven economic development.

Public officials often play leading roles in the development of transportation policy and project proposals. These officials typically do so in close concert with transportation business interests, judging that little can be achieved without their support and nothing can be achieved in the face of their opposition. Public officials routinely emphasize as well that their proposals are equitable, but overwhelmingly with a focus on geographic and/or user group rather than redistributive equity.

This is not the entire story. Unlike the rest of the transportation system, mass transit is today almost entirely public, including vehicle ownership and operation. It is roughly four-fifths taxpayer financed, with the tax revenue drawn from sources unrelated to transit use. And one of its core functions is to serve those without easy access to cars. Issues of redistributive equity are, therefore, more salient in mass transit than other sectors of transportation policy.

TABLE 2
Policy Type and Degree of
Focus on Redistribution

	ECONOMIC POLICY	SOCIAL POLICY
LITTLE FOCUS ON REDISTRIBUTION	Monetary Policy Business Subsidies, Tax Incentives, and Regulatory Programs Most Public Infrastructure Spending Agriculture	Abortion Civil Liberties Criminal Justice
HIGH FOCUS ON REDISTRIBUTION	Unemployment Insurance Job Training Programs	Medicaid Supplemental Security Income Food Stamps Housing Vouchers Compensatory Education

Even in the transit sector, though, services that sharply target the poor and disabled have found traction mainly in campaigns to broaden the coalition for conventional highway and transit expenditures. And redistributive equity is marginal even within mass transit. As John Pucher and others have documented, for example, though low-income transit users rely mainly on buses, transit subsidies have consistently been skewed heavily toward rail systems. This is not to say, however, that low-income households rely primarily on transit. John Pucher and John L. Renne have documented that as of 2001 members of urban households with incomes below \$20,000 made 76 percent of their trips by auto and just 4.6 percent by transit.

REFORM IS IN THE AIR:

WHAT IS EQUITY'S PLACE?

Much debate in recent years focuses on rectifying perceived shortfalls in surface transport finance. Since Congress last raised the federal gas tax in 1993, inflation has cut its buying power by one-third, and Highway Trust Fund expenditures have consistently exceeded income since 2001. A variety of national study groups have sought to address this problem in recent years. On the subject of equity, their analyses have scarcely varied.

By way of illustration, consider the National Transportation Policy Project, which took place under the auspices of the Bi-Partisan Policy Center. Its 25 members, of whom I was one, included a mix of former public officials, business people, nonprofit representatives, and academics. The final report was unanimous.

At an early meeting, the group identified six national transportation goals: economic growth, national connectivity, metropolitan accessibility, environmental sustainability, energy security, and safety. Several members immediately questioned the absence of equity from this list. They encountered a buzz-saw of arguments *against* adding it, most notably:

- Consensus on a definition would be impossible to achieve.
- The equity claims with greatest force in transportation politics are put forward by states and user groups seeking benefits in proportion to their fiscal contributions.
- Including redistributive equity as a program goal would severely divide the committee itself, and such a divide would undermine its mission.

Within a few minutes it was clear that the great majority of members found these arguments compelling, so the committee moved on.

The committee did return to equity, however, when laying out its specific recommendations. Here it urged creating a small Essential Access Program providing aid to the states “to ensure that transportation remains accessible for the underserved and disadvantaged.” It recommended that 2 percent of federal funding be allocated for this program. >



THE PRINCIPLE OF “DO NO HARM”

Though surface transportation policies rarely identify redistribution as a policy goal, the interests of disadvantaged people often loom large as constraints on policies and projects. American government is, for good reason, commonly described as a veto-group system. To succeed, the champions of new policies or spending commitments must typically prevail at many decision points, often at multiple levels of government, and at times with requirements for super-majorities (as in the US Senate). Opponents, by contrast, need to prevail only once. This structure empowers any group seeking to block new policy and project initiatives—most commonly groups representing the rich and powerful, but also at times those representing the disadvantaged. Such veto power is even more important for the disadvantaged because—weak in resources and organizational

capacity—they rarely have the capacity to pursue more proactive agendas.

During the 1950s and 1960s, new federal aid programs of unprecedented scale—most notably, for freeway construction and Urban Renewal—did for the first time displace large numbers of people. These programs seemed unstoppable at first, but within 10 to 15 years of hitting the ground they provoked intense opposition, including full-blown riots. This opposition in turn led to laws mandating citizen participation, strict environmental standards and review procedures, and strong protections for public open space and historic sites.

An ideological shift accompanied these developments. Community benefits could no longer be justified by the utilitarian standard of “the greatest good for the greatest number.” It became less acceptable to displace people who happened to be in the way, despoil the environment, or destroy precious amenities such as key historic sites. Though originally applied to projects involving physical displacement, the same principle is now frequently invoked against fiscal proposals that would disrupt prevailing lifestyles for significant numbers of

people, such as fuel tax increases or new highway tolls.

In our book, *Megaprojects*, David Luberoff and I labeled this new ethic “Do No Harm.” In most cases, it simply leads policy makers to reject or redesign proposals that leave some groups notably worse off. But it also has a significant redistributive component because development initiatives have been far more likely to harm the poor than the rich. Poor neighborhoods are frequently viewed as blights rather than assets. They are weakly represented in the corridors of power. And they are less equipped to cope when their lives are disrupted.

CONGESTION PRICING: WHY SO DIFFICULT?

When academics address surface transportation policy reform today, they invariably recommend road pricing to internalize the costs of negative externalities that motorists impose on others, such as congestion and pollution. The simplest proposal, at least conceptually, is congestion pricing.



Congestion pricing proposals have made some headway abroad, but little so far in the US. Principal obstacles include: entrenched perspectives rooted in history (path dependency), equity arguments from groups opposed to rationing by price in the public sector, general anti-tax sentiment, and the many opportunities for minority veto discussed earlier. The first two are tightly linked in that the equity arguments hinge on a path-dependent understanding of roads as quintessentially public.

If the nation were just now starting to build expressways, the system would almost surely be developed on the model of a public utility, where direct customer payments provide most of the revenue. Railroads, trucking, aviation, and even mass transit systems developed in this way in the late 19th and early 20th centuries. Expressways evolved from local streets, however, and tolling, even on limited-access roads, was highly intrusive, space-consuming, expensive, and a source of significant traffic delays until the late 20th century. When the federal government commenced highway aid in 1916, it principally aimed to “get the farmers out of the mud.” Rural roads were unlikely candidates for toll financing. As Gary T. Schwartz wrote 60 years later, the very first paragraph of the 1916 Act “required that all federally funded roads be ‘free from tolls of all kinds,’ [and this provision was] continued forward in all subsequent highway legislation.”

Americans have been conditioned to think of roads as thoroughly public, more akin to public parks and schools than to telecommunications, aviation, or power networks, and thus properly organized around egalitarian rather than market norms. Road pricing proposals invite the charge that they favor the affluent in use of a public resource. This critique has not precluded the use of toll financing to construct freeways, bridges, and tunnels where tax resources have been unavailable, but the rationale for the tolls has invariably been to pay off the bonds. The rationale for tolling has never been to manage demand.

Political leaders have recently sought to implement congestion pricing in a few exceptional cases. These initiatives have taken two forms: Central Area Pricing, involving charges for driving in the central business districts of large cities, and High Occupancy Toll (HOT) lanes in congested freeway corridors. Central Area Pricing, blocked primarily by redistributive equity objections, has so far made no headway in the US. In contrast, many American cities currently operate HOT lanes, with tolls that vary in real time to manage congestion, and many more are on the drawing boards. How have HOT lane advocates overcome the usual obstacles to congestion pricing?

HOT LANES

HOT lanes evolved from two road management innovations of the 1960s and 1970s: bus-only and High Occupancy Vehicle (HOV) lanes. When cities realized that new freeway construction could not keep pace with rising traffic, they first dedicated lanes within existing roads for buses only. But only a few corridors in the United States carried enough buses to utilize most of the capacity of a freeway lane. This underuse led to the idea of admitting carpools with three or more occupants, and the bus lanes became HOV lanes. In most cases, however, these HOV lanes also proved to have conspicuous unused capacity, which irritated motorists in the adjacent, congested lanes. Beginning in the 1980s, most HOV lanes opened to two-person carpools as well. Even this rarely solved the problem of apparent wasted capacity. In response, several HOV lanes were actually converted back to general-purpose use. ➤

*During the
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The HOT lane idea provided a solution: allocate the spare capacity by price. HOT lanes initially provided hope that they could attract private investors to expand the pot of money available for highway improvements. And the first HOT lane facility did so. The developer received a 35-year franchise to build four new lanes within the right-of-way of SR-91 in Orange County, California, one of the nation’s most congested freeways. Within three years of the project’s opening in 1995, however, a fierce dispute broke out between the developer and public authorities over a state-county plan to improve SR-91’s general-purpose lanes. The developer insisted that a non-compete clause in its contract precluded any such public investment, since the HOT lane project’s viability as a private investment required severe congestion on the parallel free lanes. This struck many as an equity issue. Following several years of litigation, the Orange County Transportation Authority bought

TABLE 3
US HOT Lanes as of 2012

	SITE	OPENED	DISTANCE	DETAILS
2+ CARPOOLS (FREE AT ALL TIMES)	Alameda County, CA (I-680)	2010	14 miles	Former HOV southbound lane
	Alameda County, CA (I-580)	2011	11 miles	2 new eastbound lanes
	Denver, CO (I-25)	2006	7 miles	1 reversible, former HOV lane
	Houston, TX (I-10)	1998	40 miles	1 reversible, former HOV lane
	Houston, TX (I-10) - ADDITIONS	2009	12 miles	3 new lanes opened 2 HOT lanes in each direction Solo drivers excluded from some routes during peak hours
	Houston, TX (US 290)	2000	13.5 miles	1 reversible, former HOV lane Morning occupancy threshold is 3+ Solo drivers excluded from some routes during peak hours
	Minneapolis, MN (I-35W)	2009	12 miles	2 former HOV and shoulder lanes in each direction
	Minneapolis, MN (I-394)	2005	11 miles	1 former HOV lane in each direction
	Salt Lake City, UT (I-15)	2006	44 miles	1 former HOV lane in each direction 24 additional miles scheduled to open December 2012
	San Diego, CA (I-15)	1996	8 miles originally, 20 miles now	2 reversible lanes 2 lane expansion in each direction in progress
	Santa Clara, CA (SR237 and I-888)	2012	11 miles	1 former HOV lane in each direction
	Seattle, WA (SR167)	2008	9 miles	1 former HOV lane in each direction
3+ CARPOOLS (FREE AT ALL TIMES)	Atlanta, GA (I-85)	2011	15.5 miles	1 former HOV lane in each direction
	Orange County, CA (SR91)	1995	10 miles originally, 20 miles now	2 new lanes in each direction Eastbound 4-6pm weekdays, 3+ carpools pay 50% of the toll applicable to one- and two-occupant vehicles
	Northern Virginia, Capital Beltway (I-495)	2012	14 miles	2 new lanes in each direction
	Miami, FL (I-95)	2008/2010	7 miles	1 lane in each direction Mixture of former HOV lane and new construction Additional 14 miles to open in 2014

out the developer's interest for \$208 million. All subsequent projects were purely public until the Capital Beltway (I-495) in Northern Virginia, completed in November 2012. This 14-mile project added two HOT lanes in each direction and was financed with a mix of public and private funding. The main incentive for private investors is an 85-year concession period.

Controversies about income-based equity delayed some early HOT lane proposals, but the HOT lane advocates have successfully demonstrated that users include representatives of all income groups (though not in equal proportions) and that their shift into HOT lanes slightly alleviates congestion on the unpriced lanes as well.

Opinion poll data, although scarce, indicate little difference by income class in attitudes toward HOT lanes. A 2001 survey of both HOT lane users and non-users in San Diego, for example, found broad support, with the highest support among the lowest income group. A 2006 poll in Minneapolis also found broad support across all income levels, including 64 percent of low-income respondents.

Table 3 shows the HOT lanes in operation as of 2012, their opening dates, and their rules about the number of occupants required for private cars to avoid toll charges. The great majority are free to carpool with two or more occupants as well as transit buses, vanpools, emergency vehicles, motorcycles, vehicles with handicapped and often veteran's license plates, and in some cases clean fuel vehicles. The others are free to carpool with three or more occupants (with one minor exception, where tolls are levied on 3+ carpools for two peak hours each morning in one direction only).

In addition to the ten HOT lanes then in operation, a 2009 Federal Highway Administration study found 60 projects at various stages of planning or design, and numerous others have since been announced. Some of the largest initiatives are in Houston, which will have converted or built 138 HOT-lane miles by 2013, and in the San Francisco Bay Area, where the Metropolitan Transportation Commission has announced plans to develop 1,300 miles of HOT lanes by 2035. The latest authorization statute for surface transportation programs, signed into law in July 2012, provides blanket authority for tolling both on new federally-aided HOT lanes and HOV conversions to HOT lanes. Known as MAP-21 (Moving Ahead for Progress in the 21st Century), it specifies that vehicles with two or more occupants should normally travel free on HOT lanes, but with a major caveat. If a facility falls out of compliance with the minimum average operating speed performance standard (normally defined as 45 miles per hour), the state may require higher vehicle occupancy for free travel.

In conclusion, HOT lanes appear to be gaining favor for four reasons. They have reinvigorated a traffic-engineering concept—HOV lanes—that had become increasingly vulnerable to the charge of wasting valuable road capacity. They are very low cost relative to other means of expanding expressway capacity. They enable a subset of motorists, who freely choose to pay for it, to save significant amounts of time. And perhaps most important, they are unique among major congestion-relief options in that they satisfy the “Do No Harm” criterion of equity: they leave no one worse off. ♦

This article is adapted from “Equity, Pricing, and Surface Transportation Politics,” originally published in *Urban Affairs Review*.

FURTHER READING

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Parking without Paying

MICHAEL MANVILLE AND
JONATHAN WILLIAMS

Anyone walking through downtown Los Angeles might notice many cars parked at expired meters without a ticket. On some streets, every space is occupied, meters are unfed, and enforcement officers walk by without writing tickets. What gives? The drivers have credentials — often disabled placards — that let them park free.

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LA isn't alone. In 2010, a reporter for the *Oakland North* newspaper surveyed vehicles parked in downtown Oakland on a random weekday and found 44 percent displaying disabled placards. Chicago famously leased its parking meters to a private consortium in 2008; the consortium now says placards have cost it millions of dollars in revenue (a claim that has triggered both arbitration and a change in Illinois law). News reports from Seattle to Washington, DC tell stories of widespread placard use. In the country's densest, most congested cities, it seems many people can park without paying.

Policymakers should worry about this nonpayment, and not just because it costs cities money. Transportation scholars generally agree that cities could greatly reduce congestion and pollution if they priced driving more accurately. Charging people to drive, of course, is politically, legally, and logistically difficult. Charging people to park, while hardly easy, is at least *easier*. People are accustomed to paying for parking, and cities already have the authority to charge for it. Many cities are therefore interested in market prices (sometimes called "performance prices") for street parking. Both San Francisco and Los Angeles have partnered with the federal government on ambitious tests of performance-priced parking. The San Francisco project, *SFPark*, costs \$24.7 million. In Los Angeles, LA Express Park costs \$18.5 million.

If nonpayment is sufficiently pervasive, these experiments could fail. So too could future efforts to price parking. A price system works only when people who don't pay don't get the service. Every day we rely almost unthinkingly on prices to allocate toasters, televisions, and gasoline, but this entire edifice would crumble if 20 percent of the population could take as much gasoline as they liked, whenever they liked, regardless of price.

The government isn't going to hand out free gasoline anytime soon, but at least 24 states and many local governments *do* distribute free parking passes, in the form of disabled placards. These placards not only grant access to spaces reserved for people with disabilities, but also let their holders park free, often for unlimited time, at *any* metered space. Nor are placards difficult to get. In California, for example, doctors, nurses, nurse practitioners, optometrists and chiropractors can all certify people for placards, for everything from serious permanent impairments to temporary conditions like a sprained ankle.

We recommend that cities and states limit or eliminate free parking for disabled placards. We believe the payment exemption has high costs and few benefits. It harms both the transportation system and the environment, and offers little help to most people with disabilities.

THE LOGIC OF PRICED PARKING AND THE PROBLEM OF NONPAYMENT

Street parking is a source of endless frustration for many city residents, and this frustration has a surprisingly simple source. Cities take parking spaces that have very different values and offer them to drivers for the same price, and that price is usually zero. This mispricing has predictable results. Underpriced goods lead to shortages, so most cities suffer shortages of curb parking at busy times. Rather than accurately pricing on-street parking, however, cities force developers to supply off-street parking. This costly and counterproductive solution makes driving less expensive and housing more so.

Suppose instead that a city allows meter rates to vary by place and time of day. On any given block, the city charges the lowest price that generates a constant 85 percent occupancy rate, leaving one or two spaces always open. The parking shortage disappears, and so >

A price
system works
only when
people who
don't pay
don't get the
service.

too does the need to provide expensive parking with every building. And because *only* one or two spaces are open, no one need worry that spaces are underused, or that prices have chased away customers. The city has established a market in curbside parking.

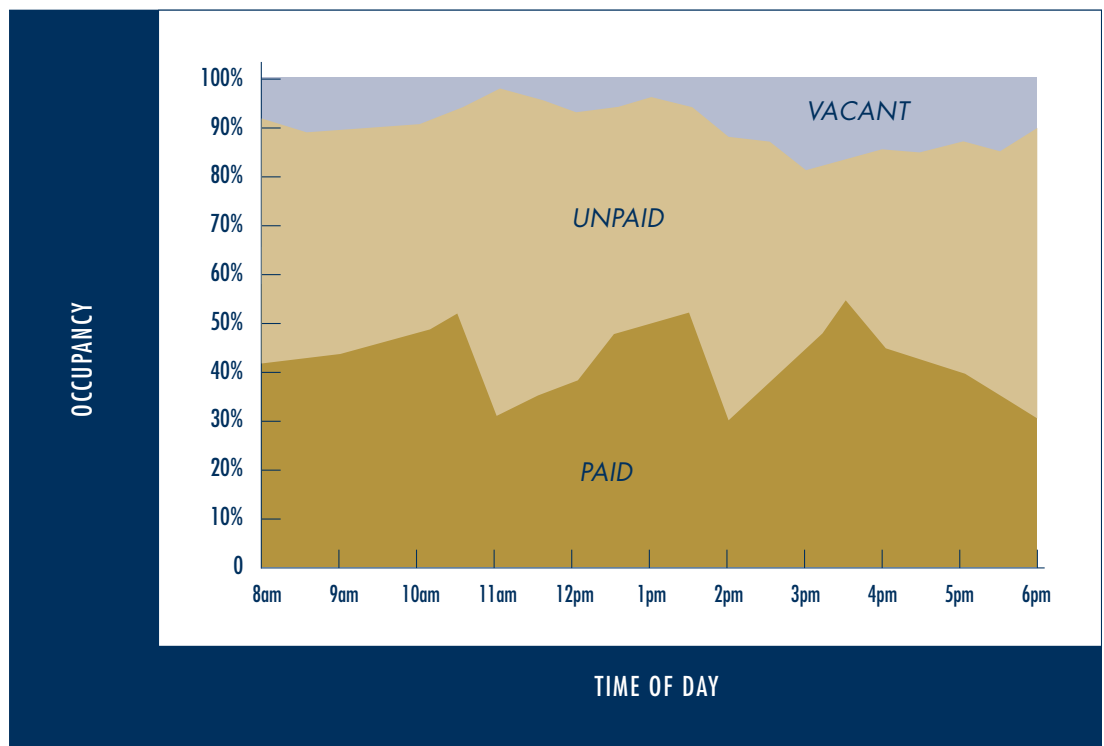
Markets only work, however, when participants have to pay. Figure 1 shows data taken from sensors under parking spaces on Hollywood Boulevard in 2009. Occupancy is consistently high—never below 80 percent—but payment is consistently low. At 1 pm, for example, about 85 percent of parking spaces are occupied, but fewer than half the vehicles have paid. At 10 am and noon almost no spaces are vacant, suggesting prices should be higher. But at both times fewer than half of drivers have paid, suggesting that higher prices might create little vacancy.

Not all nonpayment comes from disabled placards, of course. Some drivers have government credentials that let them park free. In other instances meters are broken. Many people just cheat, and park without paying. How can we be certain placards are the primary culprit?

Los Angeles has about 38,000 curbside parking meters, spread across 80 zones that match the city’s neighborhoods. In the spring of 2010, we chose 13 of the largest zones and sent researchers to record whether spaces in those zones were occupied, whether occupied spaces were paid for, and—if unpaid—the reason for nonpayment. The areas we selected had parking rates ranging from \$1 an hour (usually on the west side of Los Angeles) to \$4 an hour (in parts of downtown). We surveyed just under 5,000 meters, about 13 percent of the city’s total. Because we examined each meter at different times of day, we ended up with just over 11,300 observations.

FIGURE 1

Parking Occupancy and Payment, Hollywood Boulevard 2009 (\$1/Hour)



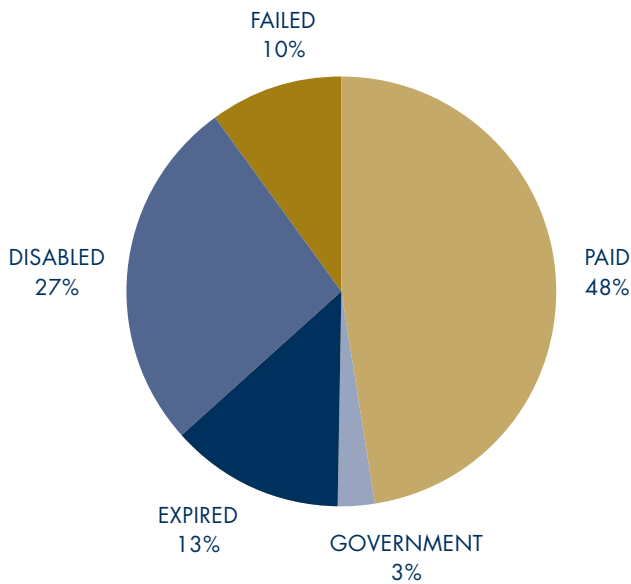


FIGURE 2
Occupied Parking Spaces

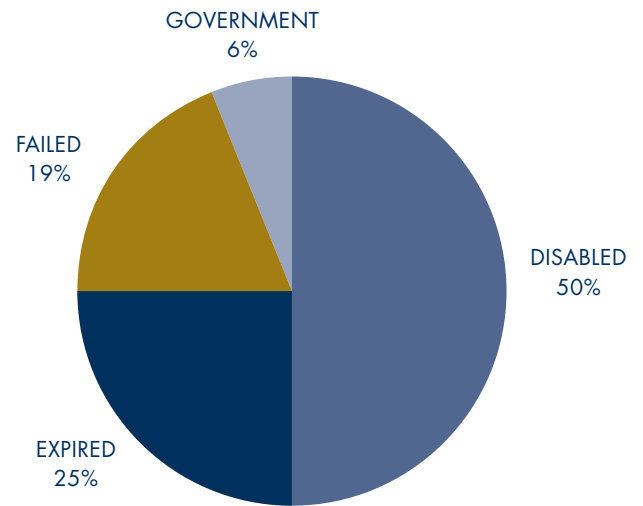


FIGURE 3
Occupied but Unpaid Parking Spaces

Across all surveyed neighborhoods, 61 percent of the meters were occupied, which suggests prices were too high. But fewer than half of the vehicles in these occupied spaces had paid, and 27 percent of them were displaying disabled placards (Figure 2). The percentages sum to more than 100 because a few vehicles fell into more than one category, such as a vehicle with a disabled placard at a failed meter. If we look only at vehicles that didn't pay (Figure 3), we see that government credentials were a minor issue, accounting for 6 percent of nonpayments. Meter failure was a substantial problem, accounting for 19 percent. This problem, however, is solvable. Newer, computerized meters rarely break down, and failure drops sharply as the share of computerized meters rises. Since we completed our surveys, LA has upgraded all its meters.

This leaves two reasons for nonpayment: disabled placards and scofflaws who simply park without paying. As Figure 3 shows, placards account for 50 percent of all nonpayment, twice the share accounted for by scofflaws. There is ample room to address the scofflaw problem because 94 percent of the illegally parked vehicles were not cited. But placards, not scofflaws, appear responsible for most of LA's unpaid parking.

The extent of placard use became even more apparent when we conducted a second set of surveys. Figures 2 and 3 showed how much space placard-displaying vehicles consumed. But parking also involves *time*. To measure how much time vehicles consumed, we sent researchers to five separate locations to watch one side of a city block for an entire metering period—usually eight or ten hours. The researchers recorded the start and end of every parking session, the time and length of payment, and any visible reason for nonpayment.

Disabled placards consumed not just the most unpaid time of any vehicle category, but also the most *occupied* time. Vehicles with placards swallowed almost 40 percent of all meter-hours, easily exceeding the time consumed by paying drivers and dwarfing the 8 percent of time consumed by scofflaws. >

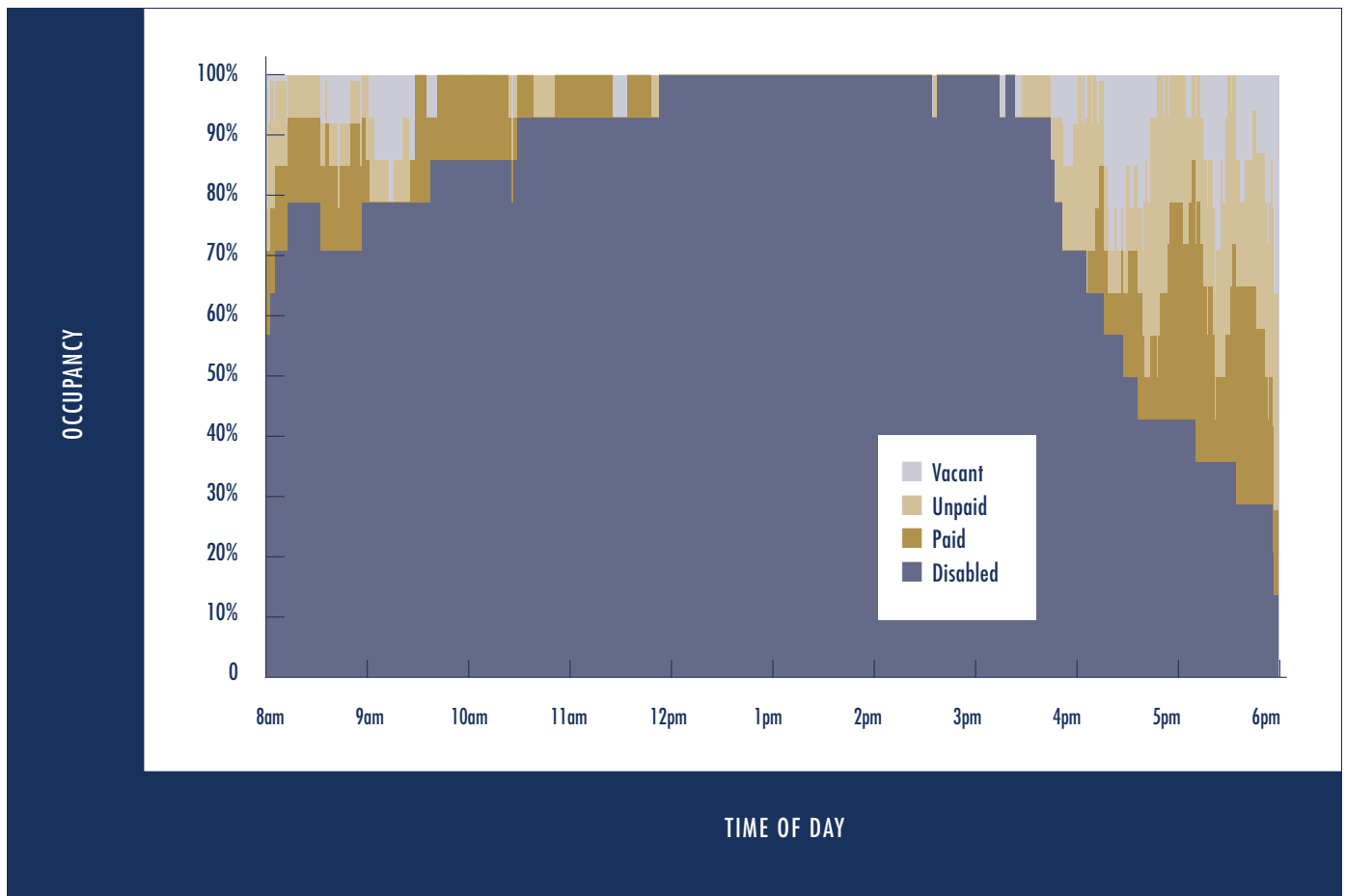


FIGURE 4
Occupancy Rates on Flower Street

Figure 4 shows a minute-by-minute representation of parking on one block of Flower Street in LA’s Financial District on March 8, 2010. At 8 am, when the meters start operating, 70 percent of the spaces are already occupied by vehicles with disabled placards. The placard share increases until noon, when placards occupy *all* spaces and no vehicles are paying. This universal nonpayment lasts almost four hours, and then gradually falls as the workday ends. Placards consumed an astonishing 80 percent of the block’s total meter time. Parking on Flower Street was \$4 an hour, but despite being occupied 95 percent of the time, the meters collected only 28 cents an hour.

This massive consumption of time—and massive loss of revenue—occurred not because many drivers used disabled placards. Rather, drivers with placards parked much longer. Disabled placards accounted for only 12 percent of all parking sessions on Flower Street, and never exceeded 25 percent in any surveyed location. But where the average vehicle without a placard parked 32 minutes, the average placard-displaying vehicle parked almost four hours. Placard holders stay longer than paying drivers because they aren’t paying. They park longer than scofflaws who also aren’t paying because they are parking *legally*. A scofflaw parked a long time is asking to be caught. A placard holder operates with no such fear, and as a result, even a relatively small number of placards can badly undermine a system of priced parking.

ENDING FREE PARKING FOR PLACARDS

If placards account for most nonpayment, and this nonpayment both costs the city money and hurts efforts to reduce pollution and congestion, then perhaps placards shouldn't entitle their holders to free parking.

The natural objection to such a proposal is that it would harm people with disabilities. But would it? To answer this question, we must distinguish between two types of benefits that placards currently offer. Placards provide *access* by setting aside some spaces for people with disabilities. This is an important public goal and placards are an effective way to accomplish it. Placards also *redistribute income* by making parking at meters free for some people. Equity is important but disabled placards are a poor way to achieve it.

A program to redistribute income should help those who need help, ensure the help is useful, and not extend help to those who don't require it. Redistributing income through placards makes sense if most people with disabilities have low incomes; if low-income people with disabilities regularly use parking meters; and if most people with disabled placards are disabled. There is good reason to doubt all of these statements.

Most people with disabilities aren't poor. People with disabilities are more likely to be poor than the able-bodied, but both the Census and the federal Survey on Income and Program Participation show that only about a fifth of people with disabilities live below the poverty line. Poverty is more common (27 percent) among those with severe disabilities, but people with severe disabilities are also less likely to drive, either because of their age (severe disability is more common in the elderly), because they are homebound or unable to operate a vehicle, or because poverty makes vehicle ownership unaffordable.

Is the placard payment exemption useful? Free street parking is worth little to people who don't use vehicles. For vehicle users, the value of the placard is the price of parking, which means a placard's value depends on location. A credential worth \$4 an hour in a large city might be worth nothing in a low-density suburb where all parking is unpriced. Disabled placards make metered parking free, but not everyone—and certainly not everyone with a disability—uses metered parking. Thus while many poor people with disabilities need income support, guaranteed free parking is not the best way to help them. By contrast, for affluent people with disabilities who live where parking is expensive, the payment exemption is useful but not necessary: it's just a subsidy for driving.

For the sake of argument, however, assume most people with disabilities *are* poor and *do* live in places with expensive parking. Even this wouldn't justify the placard exemption, because the population of people with disabilities is very different from the population with placards. The vast majority of people with placards aren't poor. When a wealthy investment banker breaks his leg kitesurfing and winds up on crutches, it makes sense to let him park in a convenient spot. It doesn't make sense to let him park everywhere for free.

The second reason the population with placards differs from the population with disabilities is fraud. Precisely because placards offer free parking, many people in perfect health use them illegally. Note that the incentive to misuse placards is greatest in places where parking is most expensive—which are also places where congestion is worst and performance parking prices can do the most good. Placard abuse will thus be most common where it does the most harm. >



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And placard abuse is common. Police stakeouts in Alexandria, Virginia in 2010 found that 90 percent of disabled credentials were being used illegally. In 2012, a disability rights advocate called Illinois's placard exemption "wide open and eligible for abuse." In 2013, a local CBS station used hidden cameras to film members of a high-end LA gym hanging placards in vehicles and then vigorously working out. Our own surveyors repeatedly witnessed what appeared to be fraud. In a particularly galling example, a man hung a placard in a van, loaded a dolly with heavy boxes, and then bounced the dolly down a flight of stairs into a subterranean food court. He remained parked for over 10 hours.

Able-bodied people who abuse placards deny curb parking spaces to others, including people with legitimate disabilities. They deprive cities of revenue, breed cynicism about social policy, and place people whose disabilities aren't outwardly apparent under an unfair cloud of suspicion. This fraud is almost entirely driven by the placard's payment exemption.

States could end placard payment exemptions and dedicate some or all of the increased meter revenue to programs for people with disabilities, such as providing paratransit services and repairing sidewalks. Such programs will benefit all people with disabilities, not just those who park free at meters. Indeed, better sidewalks improve mobility for *everyone*, including the able-bodied. This reform will transfer income from able-bodied frauds to people with disabilities.

CONCLUSION

Good laws are hard to write, and many well-intentioned statutes go awry. Laws granting free parking to people with disabled placards confuse an undeniable need for more access with a less obvious—and often nonexistent—need for more income. Most people with disabilities aren't poor, and most poor people don't have disabilities. Perhaps more importantly, many people with disabled placards suffer from neither poverty nor disability: they are affluent and able-bodied. Thus placard exemption ordinances give income to many people who don't need it, don't give income to many people who do, deprive cities of revenue, and obstruct efforts to price driving more accurately. These laws have also created a jungle of duplicity and fraud. Ending these misguided subsidies will make cities more efficient, more equitable, and more sustainable. ♦

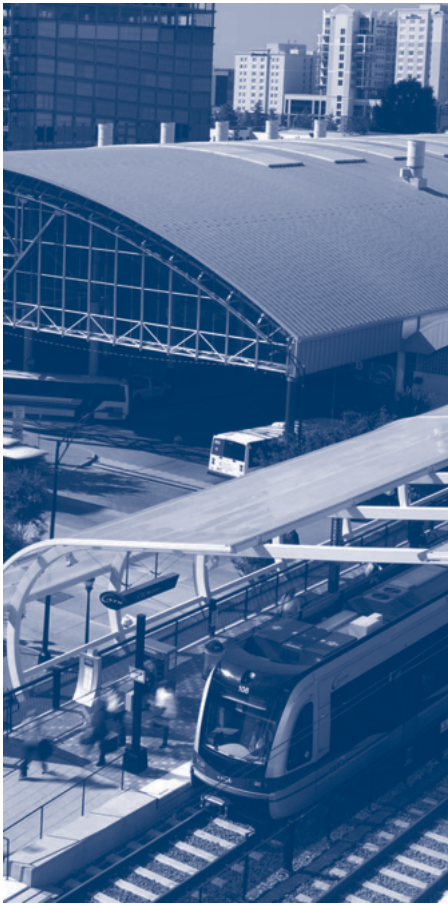
This article is adapted from "The Price Doesn't Matter if You Don't Have to Pay: Legal Exemption and Market-Priced Parking," originally published in the *Journal of Planning Education and Research*.

Is a Half-Mile Circle the Right Standard for TODs?

ERICK GUERRA AND ROBERT CERVERO

PLANNERS AND RESEARCHERS USE TRANSIT CATCHMENT AREAS—the land around stations—as geographic units for predicting ridership, assessing the impacts of transit investments and, recently, for designing transit-oriented developments (TODs). In the US, a half-mile-radius circle has become the de facto standard for rail-transit catchment areas.

There is surprisingly little evidence to justify any particular catchment area. Why a half mile? Why not a quarter mile or two-fifths of a mile? Is there anything special about a half mile or is this simply a convenient figure that has become an industry standard? A half mile roughly corresponds to the distance someone can walk in 10 minutes at 3 miles per hour and is a common estimate for the distance people *will* walk to get to a rail station. The half-mile ring is a little more than 500 acres in size. ➤



WHY CATCHMENT AREAS?

Proximity to a transit station strongly influences whether people use the service. Transit patronage, in turn, influences the cost-effectiveness of transit as well as surrounding property values. Beyond a certain distance, however, transit is unlikely to influence mode choice, land values, or land use. A transit catchment area measures a station's primary zone of influence.

People's willingness to walk to transit has largely defined this zone. Walking preferences, however, vary by destination, trip purpose, gender, age, land use, safety, weather, and the price and availability of parking. Furthermore, transit investments' impacts are not limited to the average or even maximum walking distance. Many transit users access stations by car, bike, or another transit service. Road networks, moreover, do not emanate radially from transit stations, prompting some researchers to define transit catchments based on road network distances. The half-mile transit catchment area, whether radial- or road-network-based, is more a convenient rule of thumb than a statistical or analytical construct.

TRANSIT CATCHMENT DATA AND DIRECT DEMAND MODELS

We tested to see whether the half-mile circle explains transit use better than other boundaries do. To this end, we estimated regression equations to predict ridership at 1,500 high-capacity transit stations in 21 cities across the US. We aimed to determine, statistically at least, whether there is a clear “winner”—a radial distance from rail stops that best explains ridership and thus can serve as a benchmark for station-area planning. We focused on ridership because the prospect of drawing travelers out of cars and into trains and buses is one of the principal justifications for TOD. Without new riders, TOD generates few economic, social, or environmental benefits.

To predict ridership, we used a *direct demand model*, which is based on statistical regression of observed ridership. Researchers and practitioners commonly use direct demand models as alternatives to full-blown *regional travel models* for early-stage testing of transit scenarios, such as predicting transit ridership at stations, along corridors, or for entire systems. Because modelers can build direct demand models with basic GIS software and readily available data, they can evaluate a large number of potential transit alternatives with relatively little effort. Transit planners also use these models because the pedestrian-scale features of a neighborhood do not show up in regional travel models. By focusing on an area defined within a specific distance from a transit station, direct demand models reflect actual land-use characteristics in the area most likely to influence transit ridership. We were able to collect data on the vast majority of urban rail stations in the US for direct demand modeling.

Researchers and planners often use network-based catchment areas, which are defined by road-network distances as opposed to radial distances. After testing network-based catchments in two cities, Atlanta and San Francisco, we opted to use radial ones for four reasons. First, most existing station-level direct demand models rely on radial

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catchment areas. Second, radial-based data are easier to calculate and more readily available, so they are more likely to see widespread use in the future. Third, estimating catchment areas requires an additional, somewhat arbitrary, decision when using Census data: determining the distance from the roadway to include in the catchment area. Fourth, and perhaps most important, the network-based calculations did not improve our results in the two test cities. This is likely because the parks, paths, and parking lots surrounding stations provide pedestrian access, but rarely show up in available road network files. Manually adding these pedestrian connections, however, is labor-intensive and therefore contrary to the direct demand model's objective of simplifying ridership predictions. Also, despite advances in the quality and availability of satellite imagery, identifying pedestrian access points still requires site visits to transit stations. Given 1,500 stations in 21 cities, this was outside of our project scope. We therefore used the radial definition of catchment areas in our analysis.

CATCHMENT AREAS AND RIDERSHIP PREDICTIONS

To our surprise, we found that varying the size of the radius around stations had only a small influence on the ability to predict ridership based on measures of surrounding population, jobs, and other variables. A quarter-mile radius explained variation in ridership across US transit stations about as well as a half-mile radius, which itself performed similarly to a three-quarter-mile radius. As expected, however, the results did indicate that the closer jobs and people are to transit stations, the more ridership the stations tend to generate. Figure 1 plots the statistical relationship between ridership and the number of nearby jobs and residents at six different catchment areas, ranging from 0.25 to 1.5 miles. We also included variables for transit frequency, bus connections, park-and-ride spaces, and geographic location in the models. Within a quarter mile of a station, for example, an additional 100 residents correlates with 34 additional trips per weekday and an additional 100 jobs correlates to 69 additional trips. Within a half mile, an additional 100 residents correlates with 25 more trips and an additional 100 jobs correlates with 42 more trips. >

We found that varying the size of the radius around stations had only a small influence on the ability to predict ridership.

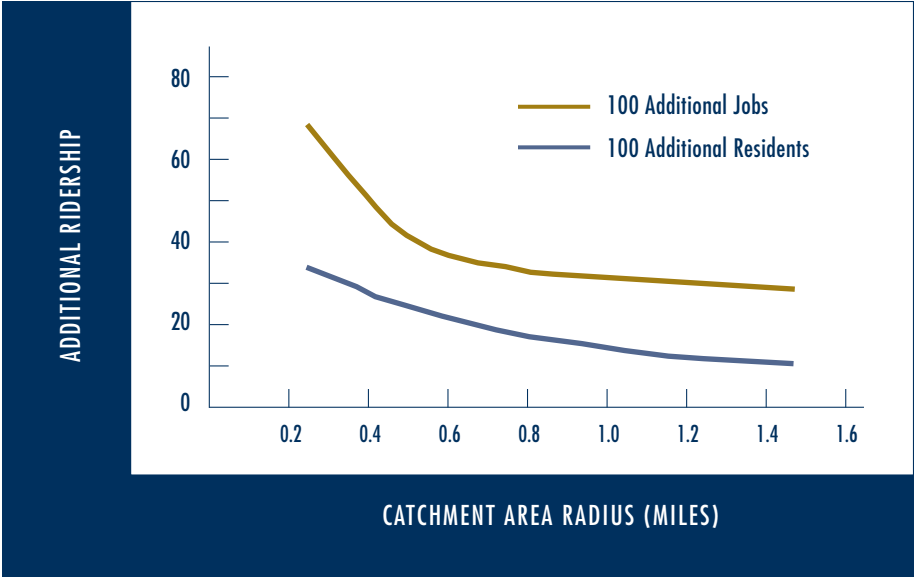


FIGURE 1
Increase in Average Weekday Ridership per 100 Additional Jobs or Residents within the Catchment Area



TOWARD A CATCHMENT AREA NORM

To define an optimal transit catchment, we combined the population and job counts from various catchments in the same model. However, due to strong relationships between catchment-based counts around each station, this produced unstable and unrealistic predictions. In other words, the number of people living within a quarter mile of a station is so closely related to the number of people living between a quarter mile and a half mile, as well as the other catchment areas, that it confounds statistical results. Through a process of eliminating and combining catchment bands, we settled on the quarter-mile catchment as the best context for modeling with job counts, and the half-mile circle as the best context for modeling with residents.

To test whether our results were reasonable, we then examined how changes in the number of jobs and residents around stations influence ridership. We estimated that a 10 percent increase in the number of jobs within a quarter mile of a transit station corresponded with a 2 to 4.7 percent increase in average weekday ridership. A 10 percent increase in the number of residents within a half mile of a transit station corresponded with a 0.9 to a 3.5 percent increase in ridership. These estimates vary according to whether transit technology and service frequency variables were included in the model, but are in line with previous studies. While transit frequency and quality encourage transit ridership, they are also highly influenced by demand. For the most part, agencies build high-capacity subways or run frequent service only where demand is high.

Results also depend on whether the model includes the city where each station is located. Some cities have higher or lower ridership because they have developed driving or transit cultures over time, or have other attributes. For example, transit use in Washington, DC is higher than the model would otherwise predict while it is lower than otherwise predicted in Baltimore. Removing city-level variables significantly reduces the predictive power of the models and increases the importance of jobs and population on ridership. The loss of explanatory power indicates that, in a national model of transit ridership, differences across transit systems are as important, or more important, than differences across transit stations.

CONCLUSION

Our results indicate that, for the purposes of *predicting* ridership, varying station catchment area or type offers little insight. We found the difference between using a quarter-mile or half-mile circle to be quite small. The benefits of using a diamond or network-based shape—whether adjusted for pedestrian paths or not—are equally small. As a result, direct demand modelers should use whatever catchment is most readily available or easily calculated. The half-mile circle is neither particularly well- nor ill-suited to predicting ridership.

By including and testing multiple quarter-mile radial bands, we find that, at a national scale, the quarter-mile radius generally works best for predicting ridership as a function of jobs, while the half-mile radius works best predicting ridership as a function of residents. For analysts who lack the data or resources to model multiple catchment areas or for those who need to choose an area from which to conduct surveys on transit-adjacent firms or households, our results support selecting firms within a quarter mile and households within a half mile. For planners and policy makers, the results give some credence to using a half-mile catchment area for TOD planning and confirm that there are advantages in concentrating retail and office developments even closer to stations. ♦

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Los Angeles

112B





Opportunities and Challenges for TODs in Southern California

ANASTASIA LOUKAITOU-SIDERIS

WHEN THE CONCEPT OF TRANSIT-ORIENTED DEVELOPMENT (TOD) first appeared in the 1980s, many planners and academics enthusiastically endorsed it as a way to increase transit ridership and mitigate sprawl. But actual implementation of TOD projects in Southern California was slow to follow. Developers and funding institutions worried about TODs viability in a region married to the car.

Today, however, the concept of TOD has moved from academic debates to implementation around the country. In Los Angeles County, private developers have built many housing and mixed-use projects near transit stations, and more are planned. Municipalities, metropolitan planning organizations (MPOs), and even many developers are enthusiastic about building near transit. Why has development around transit become popular? What are the motivations, incentives, constraints, and problems of building adjacent to stations? What strategies will likely attract development around stations?

To address these questions, I will use the examples of two Los Angeles County light-rail lines. The Blue Line, which opened in 1990, connects downtown Los Angeles to downtown Long Beach. This line used the existing right-of-way of an earlier railway. The Blue Line has been operating for 22 years but, by and large, has not catalyzed development around its stations. With the exception of a few TODs, primarily near the Long Beach stations, there has been little development along this transit corridor. On the other hand the Gold Line, which opened in 2003 and links downtown Los Angeles to Pasadena, has generated considerable development around many of its stations. In the thirteen years that separate the inauguration of the two lines, many changes—which are partly responsible for the new-found popularity of TODs—took place in the region. ➤

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LEARNING FROM PAST MISTAKES

When the Blue Line was still in the design stage, rail advocates emphasized various benefits beyond mobility that the project would bring to surrounding depressed inner city neighborhoods, such as station-related amenities and economic development. But years after the inauguration of the line, empty lots and classic signs of inner city decay dominate the vicinity of many stations. Indeed, the Blue Line has suffered from four types of problems.

Planning problems have haunted the line, including a lack of planning by municipalities, a lack of coordination among public-sector agencies, and failure on the part of transportation agencies to initiate joint development opportunities. *Environmental* problems related to contaminated sites and incompatible land uses have precluded development in the vicinity of Blue Line stations. Indeed, much of the land along the corridor was not fit for housing or was zoned for uses incompatible with TODs. *Social* problems, including poverty, unemployment, crime, and gang violence, have stymied investment in many station neighborhoods. With mostly minority and immigrant residents, these neighborhoods also lacked the clout to voice their opinions in public hearings or demand more resources. Finally, *economic* problems such as high land costs near stations, combined with a lack of development incentives, frustrated progress along the line.

The Blue Line corridor also had characteristics that counteracted successful development opportunities around its stations. These included: 1) the peripheral location of many stations, which are located in the industrial back lot of metropolitan Los Angeles, away from the center of communities and characterized by low residential densities and a complete lack of neighborhood amenities; 2) poor station interface with other transportation modes and absence of pedestrian connections to surrounding neighborhoods; 3) lack of an urban design framework for station-area development and significant regulatory barriers, such as antiquated zoning and lengthy permitting processes; 4) lack of institutional commitment and missed opportunities for land acquisition on the part of public agencies; and 5) lack of community involvement in the planning process.

PRESSING ISSUES, COUNTERVAILING TRENDS

In the years between the construction of the two lines, many municipalities realized that growth and development around station areas does not simply happen through the mere presence of a transportation network. Pressing issues and trends in the Southern California region forced decision-makers to consider new ways to accommodate urban growth.

The population of LA County was over 9.5 million by the time the Gold Line was built, and the regional MPO, the Southern California Association of Governments (SCAG), projected an additional 30 percent increase by 2025. Accommodating Southern California residents in single-family homes dotting the region's landscape would require leapfrogging into farmland and extending urban sprawl. Demographic changes, such as a growing population of transit-dependent Latino households and seniors willing to consider alternatives to suburban single-family housing, further supported the case for more TODs.



At the same time, housing affordability reached a record low in the Southern California region. This issue, combined with the recent economic crisis, meant that an increasing share of households could no longer afford single-family homes, and instead had to consider different and more affordable housing options, including duplexes, town homes, apartments, and condominiums.

According to SCAG, the Los Angeles region has the worst traffic congestion in the nation. Living in close proximity to jobs and retail opportunities is now a desirable option for urbanites wishing to avoid long commutes in congested traffic.

Solo driving has become much more expensive in recent years with gasoline prices up to \$4.70 per gallon in 2011 as compared to \$1.60 in 2001. Many Angelenos increasingly appreciate having more transportation options, including walking and riding the bus or the train. While the private car remains the undisputed travel mode of choice for most households in the region, transit has slowly increased its share.

Finally, The South Coast Air Basin has the worst air quality in the nation, and automobile emissions contribute greatly to the region's air pollution. Southern Californians typically rank the environment as an important concern in opinion polls.

These demographic, economic, and environmental trends have expanded the market for TODs and encouraged a larger segment of the public to seek alternatives to the single-family house. ➤



AN ENABLING POLICY ENVIRONMENT

A lack of institutional commitment and initiative contributed to the lackluster effect of the Blue Line on its adjacent neighborhoods. This seems to have changed in recent years. In 2006, California voters approved Proposition 1C, a \$2.8 billion bond for affordable housing that includes \$300 million for a TOD infrastructure implementation program. An additional provision of Prop 1C is the availability of loans for mixed-use, housing, and commercial developments within one quarter mile of a transit station. In 2008, LA County voters passed Measure R, dedicating a half-cent sales tax to transit and traffic congestion relief projects.

SCAG has initiated the Compass Blueprint strategy, which directs most future development towards existing and emerging centers, near transit hubs, and along major transportation corridors. In Los Angeles, the Department of City Planning has made TOD the focal point of new Specific Plans. The combined effect of these multi-jurisdictional actions has been to create an enabling policy environment, which was absent a decade ago; developers are responding.

A CHANGING MINDSET OF DEVELOPERS

For a long time developers were reluctant to build TODs because they assumed that such developments would appeal only to a narrow market segment: singles, young professionals, and “empty nesters.” However, this narrow market segment is becoming much larger. Developers building along the Gold Line corridor also targeted a broader market segment that included different age groups, families, seniors, two-income

households, and single-income earners. Developers have also responded positively to development incentives such as increased floor-area ratios, reduced parking ratios, relaxed open space requirements, and public subsidies. Importantly, these developers and their architects now see more potential for TODs, acknowledging the demand for more homes, schools, and offices in the metropolitan core instead of the suburban and exurban periphery.

TENSIONS AND CHALLENGES

While incentives and market conditions prompt municipalities and developers to pursue TODs, some challenges still remain. When TODs are developed near single-family districts, residents of these areas often resist changes that alter the established character of their neighborhoods. Designers must confront the challenge of making higher-density developments appear less dense, and TOD proponents must confront the broader challenge of bringing the public along to support the concept of TOD.

Market realities may also prevent the inclusion of pedestrian-oriented retail in station areas. Many small bakeries, coffee shops, and flower shops cannot afford the high rents in newly established TOD districts. At the same time, municipal desires for tax revenue may encourage commercial uses that are not necessarily pedestrian- or transit-friendly.

High rents and sale prices in some TOD areas mean that residential units are more likely to be occupied by affluent tenants with multiple cars than by transit-dependent households. This is problematic for transit agencies, planners, and public officials who wish to boost transit ridership. Additionally, the introduction of high-density development in a neighborhood without a simultaneous change from driving to walking, biking, or transit will likely increase traffic congestion in the immediate area, a concern raised by many critics of high-density projects. Thus a tension arises between more local traffic and regional reductions in vehicle-miles traveled.

Parking requirements for TODs also raise questions. Too much parking may prompt people to drive rather than ride the train, whereas too little parking may frustrate residential and commercial tenants. Low parking requirements may encourage TOD residents to choose transit over cars. Some developers expressed concern about the marketability of their project if it does not have ample parking, but developers can, of course, provide more parking if they think the market demands it.

Deciding whether to provide development incentives or impose development fees in a given station area is a delicate process. Incentives such as density bonuses, higher floor area ratios and building heights, and reduced parking requirements allow developers to improve the profitability of TODs. Development fees and requirements for affordable housing or open space can give cities important amenities but may also serve as disincentives for development.

Proponents of TOD face three additional types of challenges: 1) Procedural/Planning challenges, including difficulties associated with coordinating and balancing the various needs of stakeholders in complex joint development and infill projects; 2) Economic/Market challenges, including the rising cost of land in station neighborhoods that often follows the announcement of a new transit line, as well as typically higher construction costs for mixed-use projects; 3) Physical/Environmental challenges, including noise from transit vehicles and technical difficulties associated with building very close to a transit line. ➤

A tension arises between more local traffic and regional reductions in vehicle-miles traveled.



ADDRESSING THE CHALLENGES

Many factors are working in favor of development around transit in Southern California. These factors include a willingness on the part of municipalities to encourage TODs, a regional vision that encourages development around transportation nodes, an enabling policy environment, developers' changing mindsets, and pressing environmental and transportation concerns in the region prompting an exploration of alternative housing options. Still, certain challenges remain, and the following suggestions respond directly to them.

- *Plan stations near people and activities*

Good planning for TODs begins with the planning of the transportation line. Station location is the most important factor in attracting development at a particular site. As the failure of the Blue Line to stimulate development has shown, stations should be located at the “front door” of communities, near other urban amenities and existing nodes of activity, such as schools, parks, and retail.

- *Zone for TODs*

Municipalities that pre-plan for TODs in anticipation of a transit line are in a better position to attract development. Designation of transit overlay zones that extend a half mile around transit stations and have defined guidelines and incentives for TODs can ensure that a city's goals are respected, minimize uncertainty for developers, and streamline the development process.

- *Educate and involve the public*

In a region not known for its transit culture, educating the public about the potential benefits of TOD is crucial. Ideally, communities can formulate a shared vision as part of a proactive public sector planning process prior to the designation of a TOD district. Residents are more likely to welcome aesthetically appealing TODs in their neighborhoods. Well-designed TODs with smaller, more affordable units (condos, apartments, and lofts) can increase available housing options and attract those priced out of the single-family housing market.

- *Develop strong public/private partnerships*

TODs provide opportunities for joint development agreements and cost-sharing projects (e.g., parking structures and plazas). Partnerships between developers, municipalities, and transportation agencies can reduce costs for developers and ensure desirable amenities for neighborhoods. Cities can reduce developers' costs by allowing TOD building “by right” if projects comply with the requirements of a transit overlay zone. Cities can also identify empty or underutilized sites and help convert them to developable lots.

- *Achieve better coordination among different public entities*

Frequently the involvement of different public agencies and actors with different requirements, goals, expectations, and levels of authority stymies opportunities for TOD projects. The establishment of a *Corridor Coordinating Council* as a Joint

Powers Authority, consisting of high-level representatives from different public sector agencies involved in corridor development, can help establish a corridor-level TOD vision and set goals for successful projects.

■ *Find the right balance between carrots and sticks*

Development fees and other requirements can bring desirable amenities to a jurisdiction but may scare developers away. Cities must monitor the balance between incentives and requirements, weighing the condition of the economy and other market forces, the development potential, and desirability of a site for developers.

■ *Actively recruit pedestrian-oriented, transit-friendly uses*

The ideal of a transit village with pedestrian-oriented and transit-friendly uses, neighborhood retail, galleries, drug stores, bakeries, and coffee shops generating foot traffic will not be realized if such commercial tenants cannot afford to rent space in new developments. In certain cases, the municipalities may consider offering tax incentives (for the first few years) to help create a critical mass of desirable pedestrian-oriented tenants.

■ *Resolve the parking dilemma*

To address the parking dilemma for TOD projects, cities can 1) decouple parking from residential development and give residents the option to purchase a unit with or without parking; 2) develop maximum parking standards for TODs; 3) explore the potential for shared parking; and 4) allow developers to satisfy parking requirements by leasing parking spaces in adjacent structures.

■ *Make transit more appealing*

Most important, cities find TODs appealing because officials expect them to increase transit ridership. This, however, will not happen if transit is inconvenient. Good multimodal linkages should connect transit stops to neighborhoods. To incentivize ridership, cities and developers may consider offering discounted weekend and monthly passes, as well as free shuttle rides connecting stations to neighborhoods.

CONCLUSION

TODs are certainly not a panacea for the region's problems. However, by encouraging development around transit, expanding the supply of housing, and offering convenient transit as a modal choice, TODs are an indispensable component of a regional strategy to reduce traffic and accommodate growth in ways that preserve long-term sustainability. ♦

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GREENHOUSE GAS MANAGEMENT:

Local Efforts to Curb a Global Phenomenon

JUAN MATUTE

In 2008, California adopted the Sustainable Communities and Climate Protection Act, or SB 375. Enforced by the California Air Resources Board, SB 375 seeks to lower greenhouse gas emissions by changing land use and travel behavior. The law requires each of the state's metropolitan planning organizations to create a "Sustainable Communities Strategy," which outlines an integrated regional transportation and land use plan to meet state-prescribed 2020 and 2035 greenhouse gas targets.

The regional targets vary based on local differences in strategy and population growth. Rather than prescribing specific measures, SB 375 affords local and regional planners flexibility. To achieve their targets, however, regions must depart from prior transportation and land use policies that subsidized cars and led to sprawl.

The Regional Targets Advisory Committee, a group of policymakers and technical experts who advise the California Air Resources Board, suggested that targets be equitable, ambitious, and achievable. That is, no region should suffer an excessive or unnecessary burden to accomplish its greenhouse gas target. But setting SB 375 emissions targets without excessively burdening regions requires planners to actively manage trade-offs among different regions. Planners must understand the nuances of available policy and planning options in order to achieve balance.

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Planners need to 1) understand the differences between greenhouse gas emissions and criteria pollutants; 2) account for how reducing emissions in one area may increase them elsewhere; 3) accurately measure current emissions levels and plan for a range of future scenarios; and 4) use the best tools available to craft the most effective, efficient, and equitable policies for their communities and regions.

Without the information needed to manage trade-offs, tensions may arise as neighboring jurisdictions pursue conflicting policies. The results could be all pain and little gain: unnecessary hardships paired with small reductions in greenhouse gas emission. California needs to coordinate improvements to forecasting models, measurement methods, and data collection for planners to have the best tools and information available to implement SB 375.

GREENHOUSE GASES V. CRITERIA POLLUTANTS

Greenhouse gas emissions differ substantially from traditional pollutants in their impacts and abatement strategies. Traditional contaminants, known as criteria pollutants, include ozone, particulate matter, and carbon monoxide. These pollutants can affect health and the environment anywhere from a few feet to a few hundred miles away. In contrast, greenhouse gas emissions do not affect local conditions but instead accumulate in the atmosphere over time and contribute to global climate change. The exact location of smog-forming pollution is important, but this is not the case for greenhouse gases.

Metropolitan planning organizations have decades of experience forecasting vehicle emissions for their Regional Transportation Plans. Unfortunately, existing criteria pollutant models, such as California's EMFAC air quality model, do a poor job of estimating carbon dioxide, the principle greenhouse gas. Conventional calculations incorporate average vehicle speeds, type of emissions control technology, and distance traveled. Vehicle carbon dioxide emissions, however, depend on fuel use and carbon intensity, which standard models struggle to estimate accurately. The models also tend to underestimate carbon dioxide emissions because they do not fully capture the effects of hills and stop-and-go traffic. Planners should therefore adopt new models such as the US Environmental Protection Administration's MOVES, which estimate fuel use rather than the effectiveness of a vehicle's catalytic converter and other emission-control technology.

Because greenhouse gases affect the climate regardless of their source, planners must address them differently from the way they have addressed criteria pollutants. Local hotspots of criteria pollution require careful attention because they can lead to disastrous health outcomes, like increased childhood asthma rates. Greenhouse gas hotspots in dense urban areas, however, can reduce total emissions because they often have below-average levels of emissions per capita. >

The exact location of smog-forming pollution is important, but this is not the case for greenhouse gases.



AVOIDING LEAKS

Policies that reduce emissions in one city can increase them in another. For example, the average Berkeley resident, who enjoys a temperate climate and a plethora of transportation options, has a lower greenhouse gas emissions footprint than the average Bay Area resident. To reduce regional per capita emissions, planners will want to place new housing in greenhouse-gas-efficient communities like Berkeley. However, new housing will likely contribute to a net increase in greenhouse gas emissions for the parcel and the city. If Berkeley's goal is to reduce its own greenhouse gas emissions, it will reject new housing and focus on reducing emissions from existing sources. The demand for new housing units will be met somewhere else in the region, likely a place with higher demands for driving and air conditioning.

If all greenhouse-gas-efficient cities like Berkeley seek to minimize their own footprints, future growth will occur in higher-emission areas. The resulting regional and global emissions will be higher than if new households move to greenhouse-gas-efficient neighborhoods. Because the location of greenhouse gas emissions is atmospherically unimportant, this result is bad for both Berkeley and the planet. Thus, in order to achieve regional and statewide emissions reductions, absolute emissions levels will increase in some communities and on some parcels.



THE NEED TO FORECAST

Planners need the best forecasting tools available to understand how today's planning and policy decisions will affect future emissions levels. Accurate measurement of current greenhouse gas emissions provides the foundation for future forecasts. Forecasts are necessary to account for the lag between the implementation of a policy decision and the time when emissions changes can be measured. Consider a new rail transit line: several years will elapse between project approval and operation, and decades more will pass before ridership stabilizes and planners can measure the line's effects. A region striving to reduce greenhouse gas emissions will want to estimate the performance of their plans, policies, and projects before they start construction.

If measuring past emissions is a science, then forecasting future emissions is an art. Forecasting the future ridership of a transit line, the displaced vehicle trips, and the fuel efficiency of those vehicles is difficult enough in isolation. Forecasting emissions is even more difficult when cities, regions, the state, and nation concurrently implement emissions policies. Most models are designed to forecast a single system in isolation, such as the ridership response to a new transit project. Isolated models are unlikely to provide planners the information they need amidst changing policies and markets at the local, regional, and national levels.

English statistician George Box wrote, "Essentially, all models are wrong, but some are useful." To prove useful for implementing SB 375, planners need models that provide them with the information they need to manage trade-offs in goals and objectives. The foundations for such models currently exist in California agencies: discrete choice and equilibrium-based land use models, activity-based transportation models, and integrated modal emissions models. These models, however, must use the latest empirical data, integrate with each other, and account for the complexity of urban systems.

Current models are starved for good data. If data are available, they are usually based on studies that attempt to isolate the effects of a single policy or measure. Little information exists on the interaction between measures that cities and regions pursue. The collection of transportation and land use policies that will be implemented in California extend beyond the existing sample used for forecasting, and even the best forecast models currently available rely on simple extrapolation and other assumptions, reducing their validity in assessing complex outcomes.

THINKING EQUITABLY

California's cap on emissions from transportation fuels, starting in 2015, will raise gasoline prices and place a disproportionate burden on exurban communities like Barstow, where many residents commute long distances by automobile. This burden will be lower in dense areas with multiple transportation options, like Berkeley. It is likely that current and future Berkeley residents will adapt better to a low-carbon California compared to residents of Barstow.

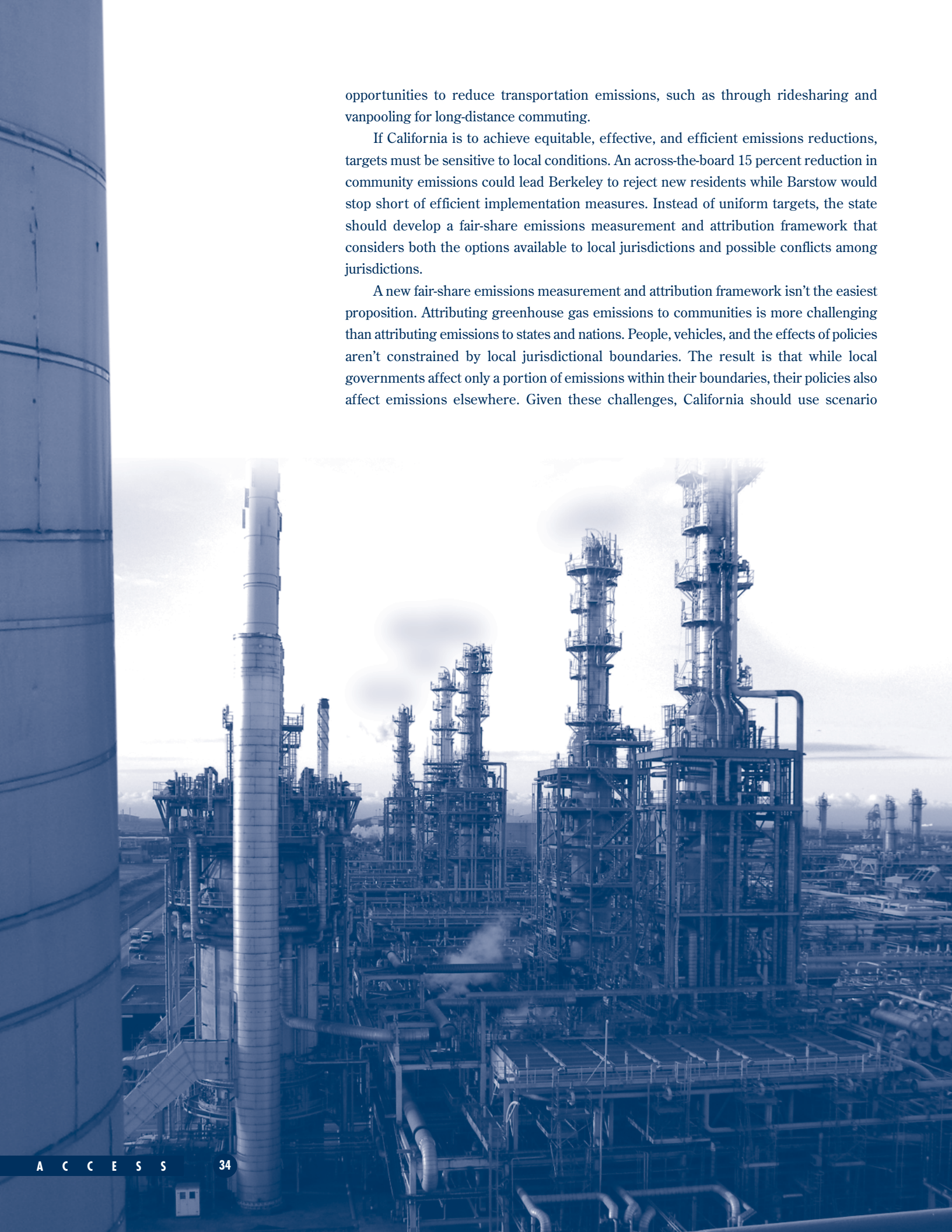
Communities like Berkeley have already implemented many of their options to reduce the average resident's carbon footprint. Such communities can best serve the state's low-carbon transition by accommodating additional residents. Communities like Barstow have greater exposure to future fuel price increases, but also have plentiful >

*Policies that
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in another.*

opportunities to reduce transportation emissions, such as through ridesharing and vanpooling for long-distance commuting.

If California is to achieve equitable, effective, and efficient emissions reductions, targets must be sensitive to local conditions. An across-the-board 15 percent reduction in community emissions could lead Berkeley to reject new residents while Barstow would stop short of efficient implementation measures. Instead of uniform targets, the state should develop a fair-share emissions measurement and attribution framework that considers both the options available to local jurisdictions and possible conflicts among jurisdictions.

A new fair-share emissions measurement and attribution framework isn't the easiest proposition. Attributing greenhouse gas emissions to communities is more challenging than attributing emissions to states and nations. People, vehicles, and the effects of policies aren't constrained by local jurisdictional boundaries. The result is that while local governments affect only a portion of emissions within their boundaries, their policies also affect emissions elsewhere. Given these challenges, California should use scenario



forecasts to identify jurisdictions that can most effectively and efficiently control their emissions. Such a framework would help communities and regions identify good policies and projects while implicitly adjusting for factors outside of local control. This framework logically extends prior practice; the California Air Resources Board used regional scenario forecasts to set the targets for SB 375.

SOLUTIONS FOR CALIFORNIA

The need to improve local and regional greenhouse gas emissions measurements—to control for leakage, to improve emissions forecasts, and to attribute emissions equitably—may seem daunting. Accomplishing all of these goals, however, requires the same work: better data, methods, and models.

The state has the scale, expertise, and resources to coordinate a program that will also serve as a template for other states. With established standards, modelers can work toward automated processing of input data. Anonymous travel data from smartphones and global positioning system receivers will provide a robust yet sensitive data collection option to quickly improve models.

California's transportation sector accounts for 36 percent of greenhouse gas emissions in the state. Consequently, the state needs effective policies to address these emissions. If California can combine a better understanding of the complex factors that influence greenhouse gas emissions with a new framework to attribute responsibility for these emissions, it will be on track to meet its targets in an efficient and equitable manner. ♦

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On-Street Parking Management v. Off-Street Parking Requirements

DONALD SHOUP

Why do cities require so much off-street parking for new apartment buildings?

Many urban planners argue that residents who own cars will park on the streets if a building doesn't have enough off-street spaces. Others counter that parking requirements increase housing costs and subsidize cars. A third group says that banks will not finance new apartment buildings without parking, developers will not build them, and tenants will not rent them.

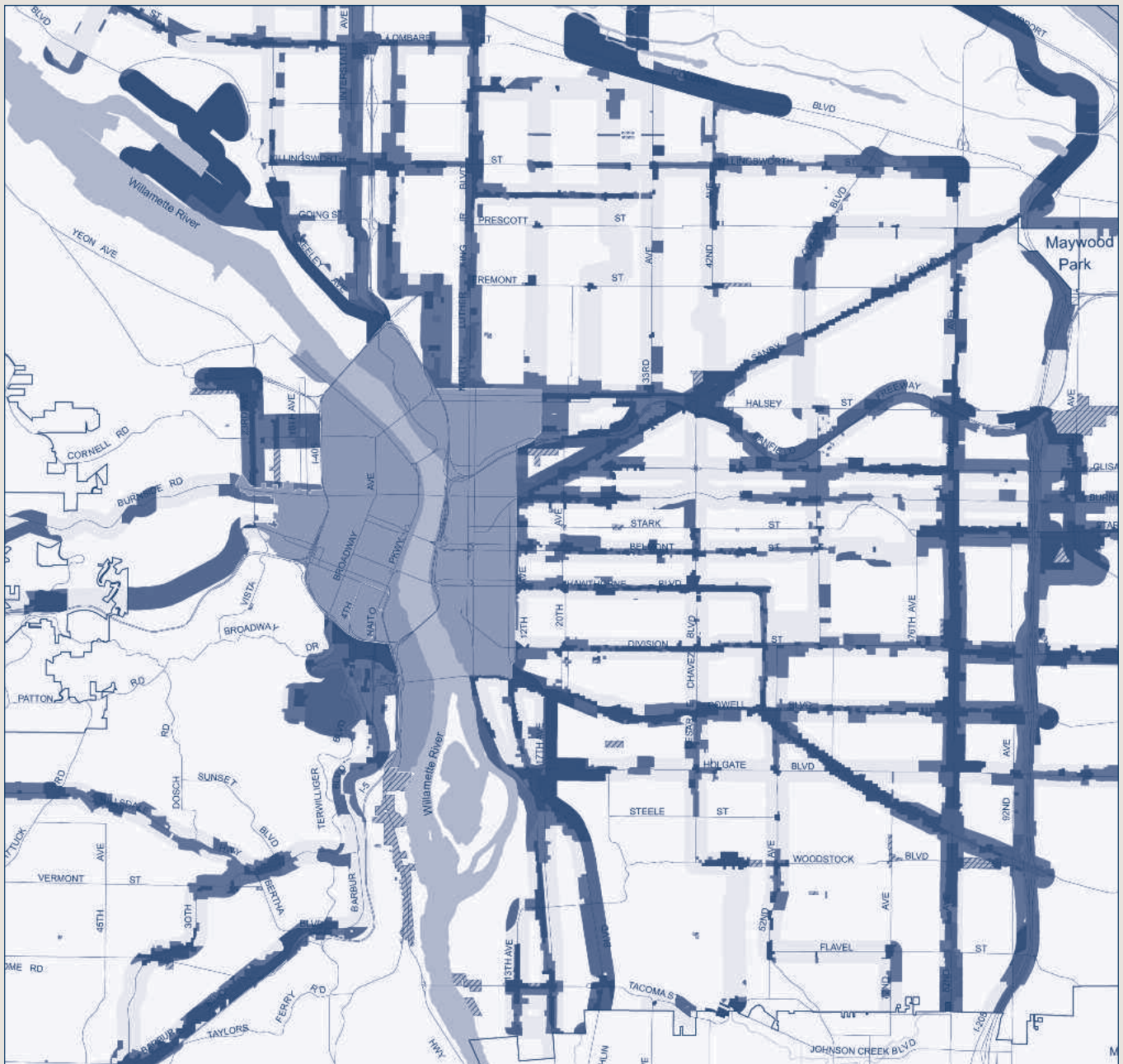
Portland, Oregon, tested these claims by removing the parking requirements for apartment buildings located within 500 feet of frequent transit service—38 percent of all parcels in the city. What happened next? Banks are lending, developers are building, and tenants are renting new apartments without parking. The market for these apartments is large because almost a quarter of Portland's renter households do not own a car.

Between 2006 and 2012, developers built 122 apartment buildings on lots exempt from parking requirements. Fifty-five of these buildings have no off-street parking, and the other 67 have an average of 0.9 parking spaces per apartment. Altogether, the 122 buildings have an average of 0.6 parking spaces per apartment.

As predicted, however, many tenants in apartments without off-street parking do own cars, and park them on the nearby streets. Residents of the surrounding neighborhoods understandably complain about parking spillover, and who can blame them? They want to keep parking easy for themselves and fear their home values will fall if the curb parking is crowded. As a result, they want the city to require off-street parking for all new apartments.

If parking requirements merely ensured enough parking spaces to prevent spillover, they wouldn't create problems. But they also increase housing costs, subsidize cars, and degrade urban design. Are off-street parking requirements worth these costs?

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No, because there is a cheaper and better way to prevent parking spillover. Instead of requiring *off-street* parking, cities can better manage *on-street* parking. One simple strategy is to allow the residents of any block to adopt an Overnight Parking Permit District. These districts prohibit overnight parking on the street except by residents and thus prevent nonresidents from storing their cars in front of residents' homes.

Los Angeles, for example, charges residents \$15 per year (less than half a cent per day) for an overnight permit. Residents can also buy guest permits for \$1 per night. Enforcement is easy because officers need to make only one visit during a night to cite all cars parked without permits. ➤

Portland removed parking requirements from all the shaded areas of this map.

If everyone can easily park free on the street, developers have little incentive to build off-street parking and little ability to charge for the parking spaces they do build. Overnight permit districts, however, give developers a strong incentive to build as much off-street parking as tenants demand. If nearby residents don't want an overnight permit district on their block, the spillover problem from apartments without parking can't be that bad.

Some cities, like Boulder, Colorado, also sell a few permits to nonresidents on blocks that regularly have a vacancy rate greater than 25 percent. Nonresidents pay market prices for the permits, each permit is valid for a specific block, and the city sells no more than four nonresident permits on any block.

To encourage residents to accept a few nonresident permits on their block, the city can dedicate the resulting revenue to pay for added public services on the block. For example, a block that allows overnight parking by four nonresidents at \$50 a month will raise \$2,400 a year for public services such as repairing sidewalks or undergrounding the overhead utility wires. Residents can keep all the on-street parking on their block for themselves, but blocks that allow a few nonresident permits will receive new public investment.

When the tenant of an apartment without parking buys an overnight permit in a nearby neighborhood, the money saved by not building off-street parking will indirectly finance public investment in the nearby neighborhood. And because an apartment without parking will have a lower market rent than an otherwise identical apartment with parking, tenants who do not own cars will no longer subsidize parking for tenants who do.

To attract tenants without cars to apartments without parking, the city can require landlords to include a free transit pass in the lease for each unit. This requirement will not burden development because providing a transit pass costs far less than building a parking space. The combination of apartments without parking, overnight permit districts, and free transit passes will encourage residents to ride public transit, cycle, and walk.

Overnight parking permits will not solve all the problems that removing off-street parking requirements can create. For example, drivers who visit or work in buildings without off-street parking may park in nearby neighborhoods during the day. In this case, the city can add a daytime permit district on blocks that request it. If the residents agree, the city can also allow nonresidents to pay for parking on blocks that have daytime vacancies, and the revenue will pay for better public services.

Cities should manage the on-street parking supply before they remove their off-street parking requirements. Parking permit districts are a politically feasible way to begin managing on-street parking because they protect each neighborhood by charging nonresidents. Favoring insiders over outsiders for parking on public streets may seem unfair, but political reforms must start from the status quo, and progress is often merely a small step in the right direction. As Supreme Court Justice Benjamin Cardozo wrote, "Justice is not to be taken by storm. She is to be wooed by slow advances." ♦

This article is adapted from an earlier version, "Portland Should Consider Overnight Permits to Solve Its Parking Headache," originally published in *The Oregonian*. More information about Portland's parking plan is available at: <http://www.portlandoregon.gov/bps/59974>

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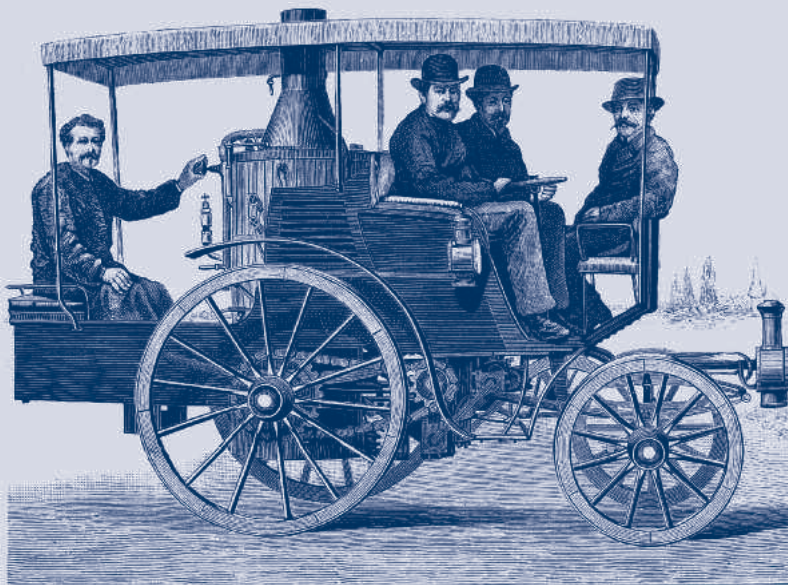
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