

hen Dave LeBlanc first moved to the Washington, D.C., metro area, he dreaded the 20-mile carpool trip to his job at the Pentagon from home in suburban Woodbridge, Va. Carpools bind schedules. "You are tied to carpool and a set time," he says. "If I want to get off early I feel bad because I have inconvenienced others."

LeBlanc's aversion to carpools is common: 76 percent of workers drive alone. Carpooling has declined from nearly 20 percent of work trips to about 12 percent since it was promoted in the 1980s. This is a disappointing trend as far as transportation policymakers concerned. Their original thinking was that people would voluntarily choose to carpool, thanks to the incentive of speedy travel in high occupancy vehicle (HOV) lanes. But today many HOV lanes are underused, while single drivers crowd non-HOV lanes.

Now comes a new traffic congestion solution: HOV lanes may be converted into HOT lanes, as in "high occupancy toll" lanes. Skeptics derisively call them "Lexus" or "limousine" lanes because they charge single drivers for the privilege of scooting into faster lines of traffic. At the same time, the spirit of HOV is preserved as cars with three-plus passengers ride free.

The prospect of toll money has attracted private investment. Fluor Enterprises, a subsidiary of California-based Fluor Corp., and Transurban, an Australian firm, are teaming up to build four HOT lanes in the center of a 12-lane project on the Capital Beltway in the D.C. metro area, a project on Virginia's drawing board for some eight years. Another HOT plan adds a third lane to the existing HOV system along I-95/395, and extends those lanes 25 miles farther south on Interstate 95 in Northern Virginia, says Gary

Groat, Fluor's director of project development. Tolls, collected through a transponder, will vary according to the number of cars on the road to ensure free flow. Pavement wires and sensors count cars, and when traffic ramps up, prices rise. It's basic supply and demand. "Nobody likes to pay the toll, but everybody likes the reliability," Groat says.

The beauty of HOT lanes is that they charge drivers for congestion they create. It's an idea popular among economists, a pricing tool to make sure drivers think about how much roads really cost. Granted, questions linger about whether they'll effectively match capacity to demand and whether they will truly bring change to the nation's highway system. But with traffic congestion rising unabated, innovations like HOT lanes are likely to grow in use. For urban motorists especially, the "free" ride may be almost over.

Prices Manage Demand

Congestion pricing for roads has been around in economic theory for decades, but it's inched forward only recently. Drivers have paid gas taxes since 1932, and in 1956 the highway bill that created an interstate system directed the taxes to the Highway Trust Fund. That's what has paid for construction and maintenance. Infrastructure investments, however, stagnated in the 1970s. Federal and state taxes were flat between 1960 and 1980. Once gas prices fell in the early 1980s, officials hiked gas taxes. (It was next to politically impossible to raise the tax during the time of high fuel prices in the 1970s.)

The gas tax has distributional problems: People using an expensive, crowded road pay the same as people driving a deserted rural one. But the nation's reliance on gas taxes to ease congestion may be coming to an end. In January, the National Academies' Transportation Research Board released a study recommending tolls, including congestion tolls, to raise road money rather than through gas taxes. The Federal Highway

Administration began funding pilot congestion pricing projects in 1991. Today, there are five HOT lane projects operating in three states, and tolls that vary according to congestion in six states. For example, express lanes with prices that vary with congestion link downtown Minneapolis with its western suburbs. The highway, on Interstate 394, opened last May. The oldest and most successful variable pricing projects are the SR 91 and I-15 projects in California.

"Those two HOT lanes represent only one-third of capacity but carry 50 percent of the traffic; it moves at the posted speed limit," Groat says of SR 91. And, he adds, by guaranteeing freer flow of traffic, those lanes actually handle more traffic than their congested counterparts.

HOT lanes can unclog roads by tweaking existing infrastructure, transforming former HOV lanes. That is no small feat when money's tight and rights-of-way are contentious and expensive to obtain. And innovations like electronic transponders and pavement sensors make the tolls practical and nearly invisible.

"Traffic on roads peaks in the morning and peaks in the evening; you could have the toll change throughout the day," says Tom Garrett, an economist at the St. Louis Fed. Although drivers probably would like to tune out this thought, he adds that some congestion is good, in an economic sense. "You don't want a road that is never congested; it might not have been worth the cost."

Few politicians promote prices for roads, at least not out loud, but economists like them because they allocate demand, especially at peak traffic times. Moreover, they accomplish what the gas tax does not: They signal to motorists that the roads they drive are not free. As every economist knows, seemingly "free" services will constantly attract excess demand; in the case of roads, that means excess traffic congestion. Think of such pricing as buying your car a space on the road, as you would buy a premium parking spot in a crowded city. Or renting a beach

Paving Southwest Virginia

The labor of road building begins long before dirt is disturbed. It includes deals, politics, debates, designs, and money. Lots of that. With demands on the public purse ever growing along with the commuter clamor for road capacity, construction can't keep up.

To spur the process, the Federal Highway Administration has offered encouragement to private participation, citing the usual benefit: Profit potential is likely to give firms incentive to seek efficiencies in time and money. Not counting extra staff oversight time, the Virginia Department of Transportation, for example, says it saved \$10 million and \$47 million on the Pocahontas Parkway and State Route 288, respectively, using public-private partnerships.

But the combination doesn't always work out. A FHWA grant designated for such road projects was recently suspended for a proposed \$2.3 billion four-lane highway in a remote edge of southwest Virginia. The road has raised regional economic hopes with the possibility that new industries will be lured by the artery, as manufacturing and mining jobs in the area wane.

The Coalfields Expressway, a 51-mile extension of its counterpart in West Virginia, was proposed in 1995 to run

across three rural Virginia counties. The path to the road's construction has been as circuitous and obscure as some of the mountain terrain it may traverse.

The proposed expressway would run through the counties of Wise, Dickenson, and Buchanan. The idea is to extend the road along its counterpart highway in West Virginia for 65 miles to Interstates 77 and 64 near Beckley, W.Va.

Funding was suspended because FHWA did not see the private-sector partner, originally Kellogg Brown & Root, assuming risk, says VDOT spokeswoman Tamara Neale. Delays and escalating costs also played a role in the funding decision. KBR signed its contract with the state over to the coal companies Pioneer Group, Inc., and Alpha Natural Resources after doing about \$30 million worth of design work. U.S. Rep. Rick Boucher, D-Va., says the new partnership may allow the grant funds to be restored. "That will enable the road to be built in an expedited way." The partnership between the coal firms and the state will benefit both parties, says Ted Pile, spokesman for Alpha Natural Resources. "This road would probably not be built without the private partnership; this coal wouldn't be

house during the summer, says Gary Groat of Fluor Enterprises. "You guarantee for a purchase price, you'll have reliable travel time; price goes up, people make decisions," he says.

Prices can change behavior, agrees Elena Safirova, an economics fellow at the Washington, D.C., think tank, Resources for the Future. "If you know you have to pay a lot on that road, you think about changing your behavior." People might walk or bike, ride the bus, carpool, or take a different route. Or, they might choose the toll road to whisk an elderly relative to the eye doctor or so they can get home in time to watch a Little League game. And there's another upside to road prices: They raise money.

Fluor Transurban will become a major investor in both of its Virginia projects, Groat observes, a first for the state. Fluor built the tolled Pocahontas Parkway in Richmond, Va., which opened in 2002. Before it opened, motorists coming from Chesterfield County, a major Richmond suburb, had no direct connection to the local airport.

Transurban now wants to buy the right to run the road - a steady stream of income for the firm.

A variety of congestion pricing or toll plans are under way throughout the world. In Sweden, the city of Stockholm is testing a system where drivers pay the equivalent of about \$1.30 to enter or leave in the daytime. Since 2003, drivers entering central London pay a "congestion charge" of 8 pounds, or about \$13.80. Singapore began charging to drive in that city in 1975; in 1998, it switched to electronic toll collection. Austria, Germany, and Switzerland charge trucks based on the distances traveled on intercity roads.

Reflecting the trend, some Fifth District states (besides Virginia) are following suit, with varying degrees of success. In North Carolina, a newly created toll road commission is studying up to nine such roads. North Carolina, with more statemaintained road miles than any other state except Texas, has no toll roads. Maryland will expand a 10-mile section of I-95, adding

express toll lanes to ease congestion. A toll road to Hilton Head Island in South Carolina is operated by a private firm. The 16-mile Southern Connector in the upstate, with traffic far below projections, was built in 2001 with some \$200 million in toll revenue bonds. And legislators in that state have proposed a toll on a section of I-73, an unbuilt highway that's supposed to go to the coast.

Who, Me?

Although people dislike tolling, it helps compensate for the hidden consequences (externalities) of driving. Those include congestion, car crashes, noise, and pollution. Kenneth Small, an economist who studies transportation issues and is an emeritus professor at the University of California at Irvine, says that by themselves, more roads won't unsnarl traffic.

"The most popular solution, road expansion, can work only temporarily in areas where there is already a built-up 'latent demand' for road travel — that is, many people who would like to travel at the most

mined without this road," he says, adding that it wouldn't be economical. "With the state providing some compensation for moving the earth, it makes sense for coal companies to go in and mine some of the reserves."

The companies, which already own the necessary machinery, will leave behind a rough grade road bed after extracting the coal. Details of compensation will be ironed out during the coming year. No groundbreaking date has been set. The route of Virginia's portion of the highway may change as engineering work is completed over the coming year.

While the road holds out hope for economic progress, it will immediately benefit commuters. An urban commuter frets and plans around congestion. A rural commuter worries and plans around distance. Jobs are scarce in rural America and could be an hour's drive. "There is a lot of commuting in and out of those counties," says Jonathan Belcher of the Virginia Coalfields Economic Development Authority.

Mitch Renkow, an economist at North Carolina State University who studies commuting patterns, says: "What we see is people traveling farther and for longer times to connect themselves from where they live to where they work."

The road will be expensive. If the current estimate were divided by the three-county population, it comes to more than \$27,500 per person. But then, rural roads are always

losers if only the immediate costs and benefits of roads are calculated. When the interstate highway system was started in 1956, N.C. State economist Renkow points out, it had a phenomenal effect on transport. "A lot of economic activity is affected by facilitating transport," he notes.

Economic developers flounder without interstate access nearby. East-west travel in the northern part of the region will be easier, Belcher says. An hour's drive from an interstate becomes a big-time cost when firms investigate sites.

"For any project heavily dependent on transportation, manufacturing or distribution, they want to be close to the interstate," he says. "If you don't have interstate quality road in your region, you're not in serious consideration for projects.

"There's probably not a month that goes by that we don't lose projects because we can't compete on a transportation basis," he says, adding that recently a firm chose Danville, Va., over the coalfields region largely because of highway access.

Dickenson County is currently without a four lane road, the only county in Virginia so lacking. The new highway would connect travelers with the Breaks Interstate Park on the Kentucky border. Dickenson and Buchanan counties' hopes for the road are so high that they have pooled resources to purchase 1,800 acres close to the proposed expressway for an industrial park.

— BETTY JOYCE NASH





High occupancy toll (HOT) lanes are proposed for Interstate 495, extending 12 miles from west of the Springfield Interchange pictured here.

popular times and places but are now deterred from doing so by congestion itself," he says. New capacity eases congestion, but former road warriors return, clogging an artery once more. Convincing the public of the value of pricing would be the single most important breakthrough for dealing with the problems cars create, Small says.

"[Tolls are] perhaps the only feasible way that will not be undone by latent demand. They are also useful for giving drivers incentives to reduce the external or 'invisible' costs they impose," he says. "They can be much more useful if they are designed explicitly with this goal in mind, instead of just trying to recover the cost of building roads." There are lots of good reasons to toll. For example, if tolls are graduated according to car emissions, then people have incentive to buy cleaner cars.

When drivers hit the road, they consider fuel costs, car prices, depreciation, and time. "The problem is there are other costs I impose on other people that I do not incur," says Tom Garrett of the St. Louis Fed. For example, more cars on busy roads worsen congestion and cars idling in traffic pollute more. "Because I don't bear the cost I'm imposing on others, I tend to overuse the roadway," he says. Toll roads force drivers to pay something

closer to the full cost of driving.

Drivers in metro areas, and increasingly on rural roads, do bear one cost — they get stuck in the very traffic they help create.

Toll roads charge drivers directly, so perhaps the toll, by easing gridlock, would offset some of what drivers already pay indirectly with their time when stuck in traffic. In its "2005 Urban Mobility Report," the Texas Transportation Institute calculated drivers' average wasted time during peak traffic in the most congested urban areas at about 47 hours annually. The final tally nationwide is about \$63 billion in wasted time and fuel. Co-authors David Schrank and Tim Lomax valued wasted time at \$13.75 per hour per person, an updated figure from a former study that examined actions people might take (cut through neighborhoods, risk a traffic ticket, pay a toll) to avoid sitting in traffic. Schrank and Lomax stress that the travel index accounts for only wasted time and fuel, not any externalities associated with driving. The costs of emissions, for example, show up elsewhere — in public health statistics and environmental problems.

The index calculates that in the D.C. metro area, it takes 45 minutes during rush hour to drive a distance that would take 30 minutes at posted speeds. The delay is estimated at \$1,278 annually per capita in time and fuel. At the other end of the spectrum

and the Fifth District, in Columbia, S.C., even the 1.8 extra minutes tacked on to an off-peak, 30-minute trip translates into \$143 a year per person.

Another study, "Traffic Congestion and Reliability" by Cambridge Systematics, calculates the annual delay just at the I-495 and I-95 bottleneck in the D.C. area at a total of 15,035 hours.

Worker Costs

One of the biggest grudges people hold against HOT lanes — and toll roads in general — is the notion that rich people can buy their way out of traffic. It just doesn't seem fair. What about poor people who can't afford the tolls?

Or what, for example, might be the impact on "slugging," the informal carpools of total strangers used by thousands of D.C. commuters? Slugging gets people to and from work and supplies occupants for HOV drivers at the same time. (See sidebar on p. 18.) Dave LeBlanc, who turned to the informal slug ride to avoid the formal carpool, fears the toll-paying drivers will clog the HOV lanes even more. "Now it is rare that you can go 60 miles an hour," he says. "My commute has increased 10 minutes from six or seven years ago." The slugging advantage will vanish, he says, as people pay to drive alone rather than stop for two slugs.

Groat of Fluor, however, believes the slugging phenomenon will flourish because drivers will want to avoid paying tolls, which will average about 15 cents per mile. Under the HOT lane scenario, when drivers see slugs, Groat says, they'll see dollar signs.

Elena Safirova and her co-authors in 2003 studied a hypothetical HOT lane along I-95 and tried to account for the problem of fairness by using different income classes in their economic model. They concluded that "all income classes broadly benefited from the conversion. The reason is that when you convert HOV lanes into HOT lanes, you free capacity you weren't aware of before because of this flexibility."

Safirova and colleagues also looked at an existing system of HOT lanes on I-15 in San Diego. They found that tolls tended to encourage ride sharing. Equity issues in that case have also been studied: Richer people tend to use HOT lanes more often than poor, but poor people do use them when time is important in cases like picking up children from day care to avoid late fees. Safirova suggests that some revenues from HOT lanes could be redirected to public transit, used more by poor people without cars.

Private Enterprise, Public Roads

Some economists advocate a highway system that provides roads as long as drivers are willing to pay for them. But Cliff Winston of the Brookings Institution worries that policymakers may fail to properly implement market-like policies.

He cites an example that emerged after the sale of the Chicago Skyway, the elevated connector road between the Loop and Northwest Indiana. Talk of reforms in pricing surfaced. "One of the early things I heard them do was talk about charging vehicles according to the number of axles. That's the perverse way of pricing." Trucks with few axles, like cement trucks, tear up roads, and need incentive to add more axles. "We have this opportunity with a new authority . . . and they did exactly what you don't want to do."

Some transportation economists advocate privatizing urban transportation (including roads, buses, rail) to insulate the issue from politics, which can promote roads where costs far outweigh benefits. Sometimes even toll roads lose money because it's unpopular to raise toll prices. Winston isn't sure that the current climate favoring congestion pricing points to transportation's exit from the political arena.

"Highway transportation is a major way elected officials reward their constituents and they don't want to give this thing up," he notes, adding that state officials are nevertheless glad to see the private money

The Commute

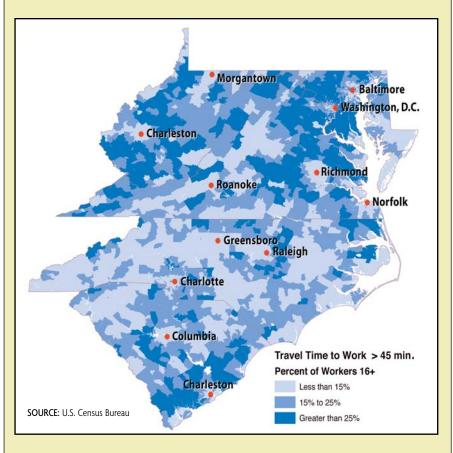
It takes most of us about 26 minutes to get to work, which is not much longer, really, than the almost 22 minutes we averaged in 1980 and only slightly more than the 22.4 minutes it took in 1990. Of course, variances abound. For every worker who walks a few blocks to the office from a downtown condo, there's another who drives solo upward of an hour from a big home in an exurb.

This map of the Fifth District shows that suburban and rural dwellers face some of the lengthiest commute times. Few communities have it worse than Charles County, Md., where about 42 percent of all workers cope with a commute of more than 45 minutes, with most of them headed into metro Washington, D.C. The story is similar in Stafford County, Va., another D.C. suburb, where more than 38 percent of workers face a 45-minute or longer commute. Ditto for Prince William, Va., and its 37 percent of workers traveling more than 45 minutes to their jobs.

But the longest commute of all in the Fifth District is found in Amelia County, Va. In this central Virginia locale about 40 miles from Richmond, almost half of all workers — 49 percent — travel 45 minutes or more to the office. This is not all that surprising: Across the Fifth District, many of the counties with the longest commuting times are in rural areas. People in Clay, Hampshire, or Lincoln counties in West Virginia spend from 39 to 45 minutes commuting. And folks in Mathews, Amelia, Warren, Surry, Buckingham, and Rappahannock counties in Virginia have an average commute ranging from 39 to 46 minutes.

On the other end of the scale is Lexington, Va., where a paltry 4 percent of workers travel more than 45 minutes to work. The living is also easy in North Carolina's Triad region, where only 7 percent of workers commute longer than 45 minutes, and metro Columbia, S.C, ringing in at just 7 percent.

— Betty Joyce Nash



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Creative Commuting

Drivers and slugs are bound by mutual need. Drivers need extra riders to get into HOV lanes; slugs need rides. Slugs are commuters of all ages and professions — people just out of college and people past retirement age. The first slug lines are anecdotally reported to have formed sometime after HOV lanes were established on I-95, in 1969.

In 1996, Dave LeBlanc stared at the slug lines for about one week before he decided to join. He had recently moved to the D.C. area and waited for the bus that would take him to the Pentagon, where he was stationed. He'd heard tales about this informal carpool of complete strangers that supplies single drivers with occupants for entry onto the high-occupancy vehicle lanes.

"It seemed so far-fetched and crazy. I wasn't going to do that," he remembers. That first day of commuting, he drove to the Tackett's Mill stop in Woodbridge, Va. He parked in the commuter lot.

"Across the street I saw all these people getting into cars and leaving," he says, and wondered whether it was a slug line. A week of paying for a slow bus ride convinced LeBlanc to take up "slugging." His commute is about 35 to 40 minutes, but the bus ride would be 15 or minutes longer. Driving solo would take even more time. As it is, he saves 15 to 20 minutes each way plus the of the fare. "Slugging drops me off

almost at the front of my building."

LeBlanc wrote the book on slugging. Really. When he started slugging 10 years ago, there was nothing but word of mouth to alert potential passengers of stops and changes in schedules. "I would slug from Tackett's Mill to the Pentagon and then hop on the Metro and go to Rosslyn," he recalls.

One afternoon on the walk to the Metro at Rosslyn, a co-worker told him a new slug line had formed nearby. LeBlanc wondered why there were no signs or brochures to inform people about slug sites. His colleague suggested he write a book.

"It's just people standing in a line," LeBlanc says, so you don't know if they're waiting for rides or a bus or something else. LeBlanc published the book and launched the Web site in 1999. The book is out of print; the Web

site, www.slug-lines.com, is loaded with lists of slug lines and even has destination signs for sluggers to print and hold when waiting for rides. The site also includes a message board where sluggers post questions and tell stories, especially about current issues, including HOT lanes. (Most of the sluggers on slug-lines.com appear worried about extinction.)

"The message board has done a lot for the slugging community," LeBlanc says. "New slugs and vintage slugs can host a question on there. Before the message board, people would e-mail me."

The sluggers follow an informal code of ethics:

Rule No. 1: No one offers money.

Rule No. 2: It's understood that you don't talk once you get into the car, except to say hello or thank you very much. It's understood that the instant carpool is simply a way to get to and from work, not to socialize.

Rule No. 3: You don't talk on your cell phone. But it is

acceptable to call and say you're going to be late if it is a long commute, LeBlanc says. Rule No. 4: You don't change the radio station, but most of the drivers will ask if you're too hot or too cold.

Rule No. 5: You don't ask for curbside service. "If you're going to some place in Crystal City that's away from the normal drop off, you don't say, 'Well, can you take me over to this corner?'"

Rule No. 6: You don't

cut the slug line. LeBlanc says it's surprising how careful most people are to observe the self-regulating system.

However, check the Web site for the occasional rule breaker. The slugging stories are priceless.

Slugs seem so civilized and orderly, but for all that, they have a most unattractive name. Here's the story: When slugging first began, commuters waited for drivers at established bus stops. But bus drivers couldn't distinguish the instant carpoolers from bona fide bus riders. The bus drivers would stop only to be waved off by the waiting "fake" bus riders. The bus drivers started calling the carpoolers "slugs," after the counterfeit coins that bus passengers occasionally tried to pass off as real. They weren't real bus riders or even real carpoolers, they were counterfeit riders. — Betty Joyce Nash



Early-morning commuters to Northern Virginia often prefer "slug" lines to traditional carpools or mass-transit commuting. "Slugs" wonder about the effects of congestion tolls on their informal carpools.

rolling in to fund projects. "But the public sector still has strong oversight. Don't expect to see too much in the way of major changes in efficiency of roads."

Private investment seems to be moving projects along faster, though. Infrastructure projects are over budget in time and money, evidence suggests. Although it's hard to predict traffic accurately, economist Kenneth Small comments that there is a tendency to overestimate traffic and underestimate costs. This bias probably stems from a desire to get projects going. "This bias affects both public and private projects, but seems to be worse for public projects, presumably because those cases are less likely to be disciplined by financial institutions with real money on the line."

Virginia was one of the first states to approve public-private partnerships in highway construction. Enacted in 1995, its law allows the Virginia Department of Transportation to contract with firms to "construct, improve, maintain, and/or operate qualifying transportation facilities." Proposals under negotiation in Virginia include truck toll lanes on I-81, the new HOT lanes in Northern Virginia, and a project in the Hampton Roads area.

Pocahontas Parkway, the abovementioned 8.8 mile connector road just outside of Richmond, was built with \$354 million in tax-exempt toll revenue bonds and opened in 2002. In a case of bad timing, it was just as air travel tanked following the terrorist attacks of Sept. 11, 2001. Traffic fell well below projections, and operators hiked the toll. While the price increase cut into the traffic by about 5 percent, revenue rose by 30 percent. "In our favor is the higher cost of gasoline," says James Atwell, president of the Pocahontas Parkway Association. "When you take the old way to go to the airport, you're going to burn a gallon of gas."

Atwell, who is former chief financial officer of VDOT, says other foreign firms like Transurban are shopping for public infrastructure in the United States. In 2005 the firm paid \$1.83 billion for a 99-year lease on the Chicago Skyway, an amount that comprises 70 percent of its annual city budget, according to estimates by the Reason Foundation, a free-market think tank based in Los Angeles. A Spanish-Australian partnership paid \$3.85 billion for the right to operate the Indiana Toll Road for 75 years earlier this year.

Details, Details

With deferred infrastructure investment, there is growing interest in using private money to build or operate toll projects. "Everybody's grappling to find money to meet those needs," Atwell says. "In the 1980s there was public will and political will to raise taxes; it has not occurred in the last 20 years, and that

has turned people in the direction of public-private partnerships, tolls, and more esoteric solutions to meet transportation infrastructure needs."

Selling or leasing toll roads and bridges sounds like a good idea. But like all good ideas, details matter. Robert Poole of the Reason Foundation comments that details in concession agreements can spell out what the private firm can and can't do, including limiting toll rates or the return on investment to prevent exploitation and monopolies.

Stickiest, though, is the non-compete clause. If the state can build a highway nearby, it can erode traffic on the toll road. "So in order to get toll roads built, state DOTs generally agree to not compete too directly," he says. This happened with the SR 91 highway in Orange County, California, and the county ended up buying out the franchise.

The pay-as-you-drive point of view is starting to hit home with urban commuters. Most spend about 26 minutes twice a day every day in a car getting to and from work. Urban life typically revolves around a commute.

"When I moved up here, everybody wanted to know, 'Where are you going to work and where are you going to live? How are you going to get to work?" LeBlanc says. Soon more commuters like LeBlanc will consider a new option: congestion tolls.

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