



Making Space:

Congestion Pricing in Cities

About the National League of Cities

The National League of Cities (NLC) is the voice of America's cities, towns and villages, representing more than 200 million people. NLC works to strengthen local leadership, influence federal policy and drive innovative solutions.

NLC's Center for City Solutions provides research and analysis on key topics and trends important to cities and creative solutions to improve the quality of life in communities.

About the Authors

Nicole DuPuis is the former manager of the Urban Innovation program, **Kyle Funk** is a research assistant, **Jason Griess** is the former Heinz Urban Innovation Fellow, **Brenna Rivett** is a principal associate and **Brooks Rainwater** is the senior executive and director of NLC's Center for City Solutions.

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Introduction

Mobility is critical to individual and societal prosperity. Individuals need the ability to get around to work, see each other and play, and commerce requires the efficient movement of goods. Cities need transportation networks that run like clockwork, whether those networks are city streets, commuter highways, rail lines or ports. But the costs of traffic congestion and maintenance backlogs are ever-growing, and current funding models are not keeping pace with city needs.

If you asked people in almost any large American city what they felt was the greatest local challenge, traffic congestion would be top of mind. That's because most Americans still travel by car. Commuting behaviors in U.S. cities look relatively grim regardless of city size. In U.S. cities with populations of 50,000 or more, 91 percent of residents commute by car. In mid-sized cities it hovers between 86 and 87 percent, and in large cities, that number drops to 78 percent (see Figure 1). Even among the 15 largest cities, only five have comprehensive transportation systems (see Figure 2).

One solution that can simultaneously reduce traffic congestion and raise revenue for maintenance and infrastructure needs is congestion pricing, also referred to as congestion charges or congestion taxes. Congestion pricing models can help us properly price the use of our roadways, which is a finite, in-demand good. These models are built on a basic economic concept: When a public good is in high demand, the price charged to use that good increases to reflect its value and thus, what users are willing to pay to use it. In the case of mobility, charges increase with traffic, thereby encouraging some drivers to get off the road and ease traffic pain points. The funds raised can be utilized to improve public infrastructure, including public transportation and roadways.

New York City is, per usual, the first American city to embrace the new model, with a recent announcement of a congestion zone in Manhattan. However, this type of paid use model is not limited to big city environments.

Today, funding for infrastructure comes from a variety of federal, state and local government sources that rely mainly on gasoline excise taxes. As costs for construction have risen and vehicles have become more fuel-efficient, the flat gas tax, which funds the Highway Trust Fund (HTF), has fallen short of meeting the nation's repair and maintenance needs. As cities and states deal with the immediate consequences of this funding shortfall, broken transit systems and traffic woes, they will need to explore innovative revenue sources and technologies to ensure that mobility remains a public, equitable good.



Road-User Charge Systems vs. Congestion Pricing

Road user charge systems require drivers “to pay based on distance driven and, perhaps other costs of road use, such as wear and tear on roads, traffic congestion, and air pollution.”¹

Congestion pricing is a type of road user charge system in which a flat or variable rate fee is charged to vehicles that drive in a specified area or zone within a city. With variable pricing, the goal is for congestion charges to rise in accordance with increased traffic congestion, thereby pushing some drivers off the road and making traffic flow more smoothly.

These programs rely on tracking drivers either through manual odometer readings or onboard devices.

Overview of Commuting Patterns in Big Cities

Figure 1: Commuting Patterns in US Cities by Size Group

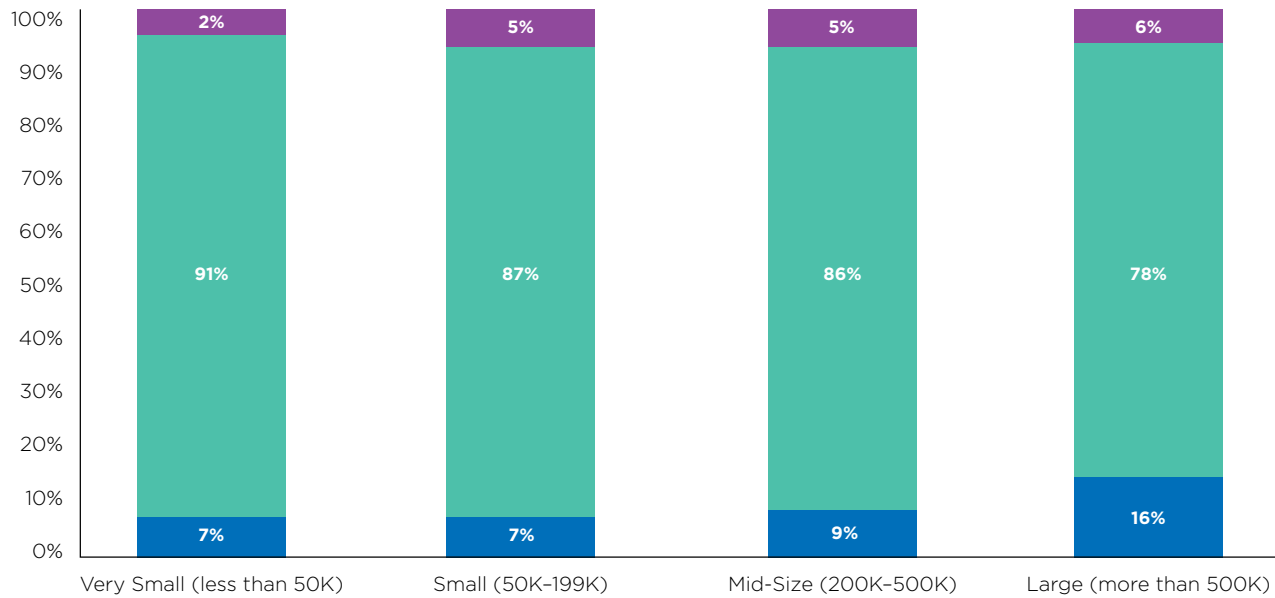
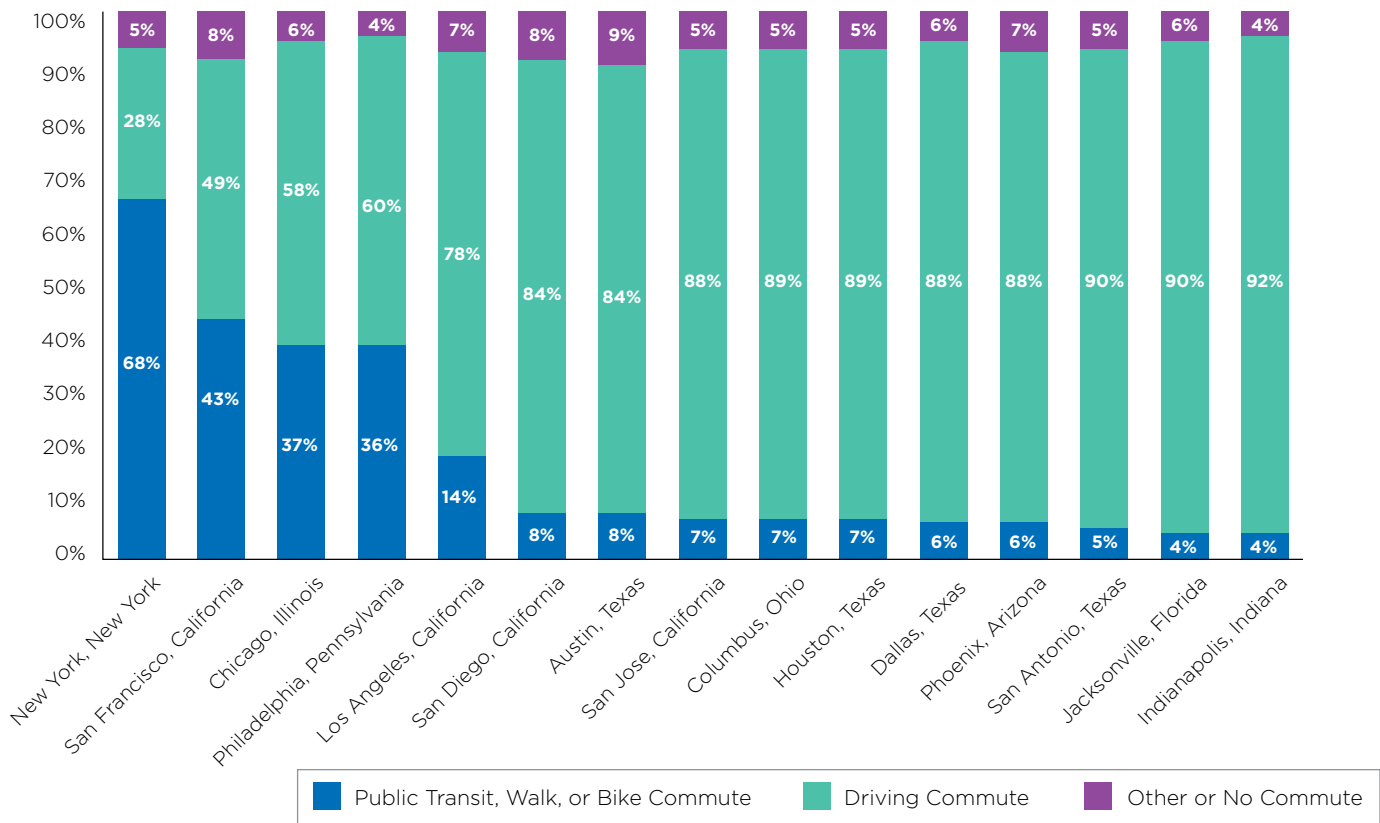


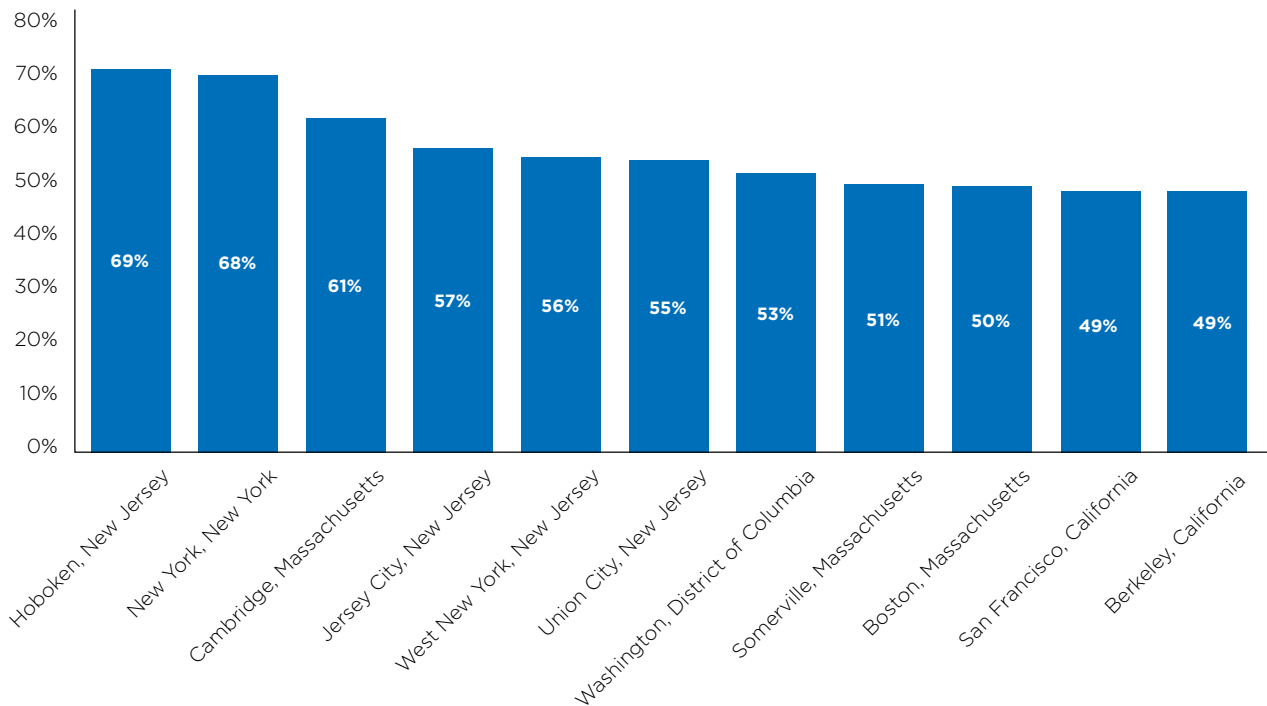
Figure 2: The 15 Largest Cities in the US are Heavily Car Dependent





Of the 15 largest cities in the United States, only New York City boasts a commuting population where the majority of commuters take public transportation to work. Additionally, of these 15 cities, only five have comprehensive public transportation systems. Unsurprisingly, these cities remain heavily reliant on car transportation.

Figure 3: Cities in which close to 50% or more of the population commutes via public transit



The cities where close to 50% or more of the population commutes via public transit center around four key hubs: New York City; Washington, D.C.; Boston, Massachusetts; and San Francisco, California. The New York and New Jersey cities included are all “ring cities” surrounding New York City and the same is true for the Massachusetts cities that surround Boston. Meanwhile, Berkeley, while not directly adjacent to San Francisco, has built a public transit system that not only serves the local city but also connects it to the larger Bay Area.

*Each bar may not add up to exactly 100% due to rounding



Case Studies

London

Background

Of the cities that have implemented congestion pricing schemes, London is the most similar to New York City in terms of population size, and economic and cultural diversity. Both serve as robust global cities with multiple transportation options. But in 2003, London took a divergent path to fund their dated transportation infrastructure.

Before implementing congestion pricing in February 2003, automobiles in the city were only reaching average speeds of 7.5 mph and the city was accruing an estimated \$3-\$6 million loss every week due to gridlock.² Around 90 percent of Londoners reported that congestion in the city was too high and expressed concerns about travel time and air pollution. Mayor Livingstone decided to act on input from residents and instituted congestion pricing. The goals of the program included reducing gridlock, improving bus services, reducing journey time by car and making the distributions of goods and services more efficient.³

The results so far appear to be extremely positive. By 2004, there was a reduction in traffic congestion and average vehicle speeds increased by 30 percent.⁴ Travel time reliability also showed a positive increase.

As more people opted to take the bus and ride their bikes, these improvements have remained steady. Even though London experienced a 20 percent population growth, there was a 9.9 percent decrease in traffic volume between 2000 and 2015.⁵ Air quality also seems to be improving in the London area, and there are approximately 1,888 fewer deaths each year because vehicle fumes have been reduced.⁶

Financing the Program

The implementation of congestion pricing throughout the city of London required an initial investment of \$214 million.⁷ With a starting rate of £5 per car in 2003 — which increased to £11.50 in 2014 — congestion pricing brought in gross revenue of about \$3.9 billion in its first 10 years, of which around half funds public transportation.⁸ The other half is used for operating costs, which are much higher than for the programs in Stockholm or Singapore, at around \$172 million per year. The annual net revenue is around \$182 million.⁹



Evolution of the Program

A price increase for the congestion zone around the London area has not been the only change to the program since implementation. Since the creation of the boundary around central downtown London, the area has both increased and decreased in size. Between 2007 and 2011, there was a Western extension zone.

Green and electric vehicles have also been affected. Vehicles that meet the Euro 5 emission standard were originally 100 percent exempt from congestion pricing. This changed in 2013 to become the Ultra-Low Emission Discount, setting a threshold that no internal combustion engine could meet at the time. A sunset period of three years was allowed for the technology to catch up, but by 2021 only zero-emission vehicles will be exempt and the discount will be eliminated altogether at the end of 2025.

Taxis and Private Hire Vehicles (PHVs) were also initially exempt from the charge. However, the program became less successful once Uber, Lyft and other ride-hailing companies entered the market. Both travel times and congestion increased. The public also started to notice, and 62 percent of residents agreed that congestion had gotten worse between 2014 and 2016.¹⁰ In response, in 2017 the Transportation Committee recommended that the city do away with exemptions for Taxis and Private Hire Vehicles. This proposal took effect in April 2019.

Lessons learned

London shows us that any congestion plan must be adaptable and flexible to changing conditions over the years. When congestion pricing was first implemented, no one could have foreseen the advent of new transportation technologies like ride-hailing as well as micromobility options including electric shared scooters and bikes. Cities that adopt congestion pricing will need to keep this in mind.

Another critical piece to keep in mind is that a congestion charge is used to solve congestion at its core; reduced emissions and increased funding for infrastructure are not the primary goals. In London, the system proved expensive to run and did not bring in as much revenue as expected. The revenues from congestion pricing only accounted for 8.5 percent of Transportation for London's annual revenue between 2014 and 2015.¹¹



Stockholm

Background

When it comes to congestion pricing, the city of Stockholm is a success story. Stockholm officially introduced congestion pricing around the city's 18 points of entry and exit in 2007. But before the initial launch, the city launched a seven-month trial in 2006 and then put congestion pricing to a ballot-referendum. This is critical because the issue was first seen as “political suicide,” but by 2014 garnered support from over two thirds of the population.¹²

Before the introduction of a congestion charge, average traffic volumes across the cordon during peak hours were just shy of 500,000 automobiles. With the introduction of the congestion tax, volumes decreased by 22 percent and have remained steady. In fact, one study found that despite population growth, traffic is continuing to decrease. Meanwhile, the number of kilometers driven in the inner city has fallen by 16 percent while the outer city has seen a reduction of 5 percent.¹³

Congestion charging in Stockholm has also resulted in greater than anticipated reductions in travel time. This effect was greatly felt in and around the inner city where delays decreased by one-third during morning peak times and by half during afternoon/evening peak periods.¹⁴

Environmental impacts as a result of congestion pricing are harder to measure given the large area and variable weather. But it is estimated that inner-city emissions fell between 10 and 15 percent. Residents and cyclists in the inner city have more positive opinions on air-quality, traffic-tempo and the number of cars.¹⁵ Lastly, there were fears that congestion pricing around the city would harm retail. This was found to not be true and have no impact at all when compared to other retail regions around the country.¹⁶

Financing the Program

The initial investment of \$236.7 million into Stockholm's congestion charging system was repaid in four years, and now the government sees an annual net profit of \$143.2 million per year.¹⁷

The Stockholm congestion charge is different from other systems that currently exist. The system utilizes variable pricing based on the time of day and is charged upon entering or exiting the city. The max amount a vehicle will pay per day is SEK 105, or \$11.30.¹⁸ There is no charge on weekends, public holidays, the day before holidays, during the evening/night hours and the whole month of July. The payments are billed monthly and are captured by cameras with automatic number plate recognition. The cameras have faced some pushback due to privacy concerns.



Evolution of the Program

The biggest evolution has been the changing of public attitudes in favor of the congestion tax. Since its initial ideation in 2003, there has been an ongoing public education campaign. Initially, only the inner city of Stockholm voted in favor of continuing the congestion pricing. However, over time the majority of residents began to favor it. This shift in perception is largely due to the fact that revenues have been funneled into road improvements outside of the inner city, allowing residents throughout the area to enjoy the benefits.

Lessons learned

Though it would be near impossible to replicate exactly what Stockholm did in another city, many of the “successes” are replicable. For example, the program’s technical system worked and the information campaign leading up to implementation adequately prepared residents for the upcoming changes.¹⁹ Both of these were crucial to gaining public trust.

Additionally, the results were visible and measurable.²⁰ Residents of Stockholm could, within the first month, see differences in overall travel time and observe empty streets during rush hour that had previously been filled. Following these changes, more studies were conducted to measure the results, and in 2016 further changes were made to the system based on research findings.

Lastly, the purpose of congestion pricing for Stockholm had clear and measurable goals: reducing congestion and improving the environment of the inner city.²¹ These goals were fulfilled.



Singapore

Background

The city of Singapore has the oldest congestion pricing program of any city in the world. The Area Licensing Scheme (ALS) lasted from 1975 to 1998, when it was replaced by the Electronic Road Pricing (ERP) program. ALS was first designed back in 1973 by a ministerial committee, which recommended policies to improve the urban landscape of Singapore. After a year of public comments, the ALS system was implemented to reduce congestion and improve public transportation.

Financing the Program

The initial cost of the system was \$110 million. The ERP has an annual operating cost of \$18.5 million and a net revenue of \$100 million that is put towards public transportation systems. The ERP contains more than 80 charge points around the city. Charging for congestion only occurs Monday through Saturday, 7:00 AM to 8:00 PM, and the system charges per-pass.

Rates vary from \$0 - \$3 depending on the time of day, the road type and local traffic conditions.²² The ability of the system to respond in real-time is critical as the ERP system is designed for the “golden ranges” of speeds between 45 and 65 kilometers per hour.²³

Evolution of the Program

The change from the ALS to the ERP was a needed switch with the advent of new and emerging technologies that allowed for faster, easier, mostly automatic transactions.²⁴ The results from the initial trial and further implementation resulted in a 90 percent accuracy rate that has only increased as more data was added.²⁵ To help with this learning system, all vehicles are required to have an In-vehicle Unit (IU) on the dashboard and a smart card with money stored on it.

The scheme has resulted in a multitude of benefits. Even with massive population growth in Singapore, traffic in the inner city has decreased by 24 percent. Average speeds have also increased by almost six miles per hour. Public transit in the form of buses and trains has seen ridership increase by 15 percent. This is partially due to the fact that money raised from the scheme is put back into these projects. The city has worked hard to expand their bus and rail system while focusing on last-mile trips through new comprehensive bike and pedestrian infrastructure. Throughout the inner city, CO₂ and other greenhouse gas emissions have been reduced by 10 to 15 percent.²⁶



Lessons Learned

Singapore is seen as the consummate leader on congestion pricing because of its system's longevity and expansiveness. Singapore's unique geography as a city-state is an extra incentive for the government to ensure that this incredibly dense island works efficiently and that people can move around via multiple modes of transit.

Due to the preponderance of transit options, the congestion pricing program and the high cost of purchasing vehicles, there are relatively few vehicles on the road. Furthermore, vehicle owners must obtain an expensive certificate that costs between 100 and 200 percent of the vehicle's price tag. These factors, taken together, have resulted in public transit becoming the favored way for Singaporeans to get around.

While no system is perfect, Singapore has worked to create iterative improvements to their program as new technology has been developed and societal goals have emerged. Ultimately, Singapore is seeking to limit traffic on the streets, create environmentally positive outcomes and develop revenue streams for transportation options.



New York

Background

On March 31, 2019, New York State passed a budget that authorized the Triborough Bridge and Tunnel Authority (TBTA), an affiliate of New York City's Metropolitan Transportation Authority, to establish a congestion pricing tolling system for Manhattan's Central Business District starting in 2021. Advocates are citing the scheme's emphasis on public investment, focus on climate and potential benefits for low-income New Yorkers without automobiles.²⁷ Importantly, the congestion pricing program is the last phase of a three-phase rollout recommended by the Fix NYC Advisory Panel in a January 2018 report. Other U.S. cities will be watching New York's rollout carefully, as it's the largest and second-most congested city in the country.²⁸

Figure 4: Manhattan Central Business District Tolling Program (CBDTP) as Described in Statute





While the details have yet to be hammered out, here's some of what we do know²⁹:

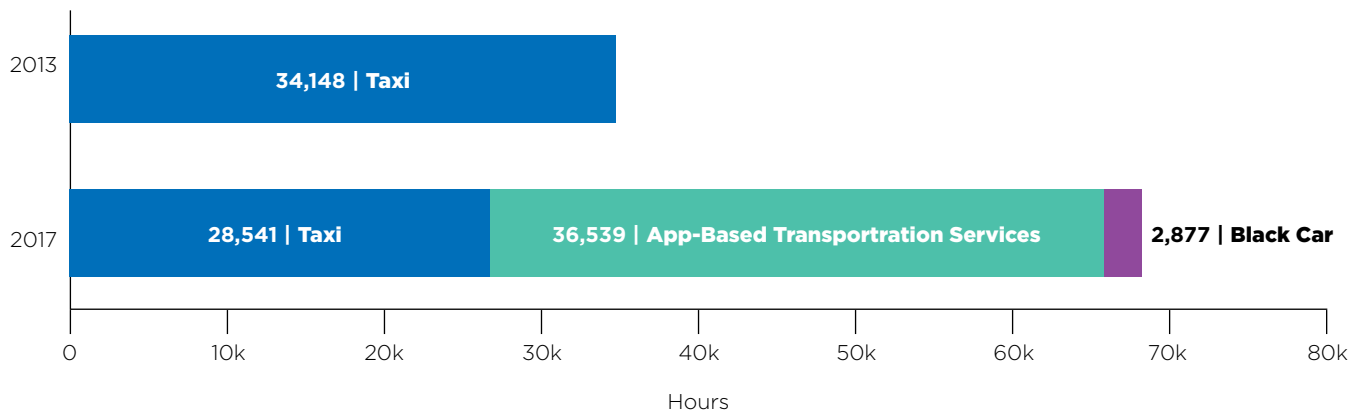
- Trips south of and including Manhattan's 60th Street will be tolled, though free movement will be allowed for through-trips on the FDR Drive and West Side Highway/9A.³⁰
- Passenger vehicles will only be tolled once per day.
- The budget includes \$100 million for the MTA to "plan, design, procure and install the new tolling technology and infrastructure."
- A six-person Traffic Mobility Review Board will be created to make recommendations about toll rates, variable pricing structures and exemptions, and to suggest further changes to the For-Hire Vehicle (FHV) congestion surcharge implemented in February 2019.

- Revenues will be placed in a lock-box fund, used to pay the operating and capital costs of the CBDTP and distributed to the New York City Transit Authority, Long Island Railroad, and Metro-North Railroad in an 80-10-10 split, respectively.
- The CBDTP will be accompanied by broader MTA reforms.

Advocates and critics both acknowledge that successful implementation of the program and subsequent revenues will greatly depend on tolling rates, exemptions and other aspects of the program design.

In 2018, New York State enacted an FHV surcharge for trips south of 96th Street, driven by findings that showed "FHVs now contribute to as much as half of the congestion in the CBD. This surcharge was a prelude to the enactment of broader Central Business District Tolling in April of this year.³¹

Figure 5: Taxi and App-Based Transportation Services unoccupied vehicle hours (between passengers) in Manhattan CBD, 2013-2017³²



Schaller Bruce. "Empty Seats, Full Streets. Fixing Manhattan's Traffic Problem," Schaller Consulting. December 2017

Potential weekday rates of \$25.34 for trucks and \$11.52 for automobiles were described in earlier reports, though final rates for the CBDTP will be recommended by the Traffic Review Mobility Board and ultimately decided by the TBTA Board. The FixNYC panel relied heavily on the Balanced Transportation Analyzer (BTA), a publicly available model developed by New York City transportation economist Charles Komanoff. The BTA reviews the costs and benefits of five different scenarios, three of which are connected to the FixNYC recommendations. Key results of the three plans described by the FixNYC panel are shown below.

Figure 6: Key results from the Balanced Transportation Analyzer.

	Fix NYC lower-range plan	Fix NYC higher-range plan	Fix NYC turbo-charged
New CBD Toll Revenue	\$780 M	\$940 M	\$1.37 B
Predicted Annual Net Benefit	\$1.89 B	\$3.68 B	\$3.97 B
Annual net revenue available to improve travel	\$1.12 B	\$1.91 B	\$2.02 B
Manhattan residents' share of new tolls + surcharges	20.7%	32.5%	29.3%
Other 4 boroughs' share of new tolls + surcharges	44.4%	37.5%	36.1%
Average change in CBD Vehicle Speeds weekdays 6am - 8pm	11.5%	20.7%	23.2%
Daily traveler time savings (hours)	256,000	507,000	544,000

Many advocates cite the massive net benefits and increases in vehicle speeds, while critics focus on the share of new tolls and surcharges that will burden residents throughout the broader region.

The Politics of Exemptions

In New York City, there will likely be a public battle over exemptions, or “carveouts.” The legislation has already permitted some exemptions, including “cars that enter the congestion pricing zone via the West Side Highway or FDR Drive and never exit those roads,” emergency vehicles, and vehicles transporting passengers with disabilities. Manhattan residents earning less than \$60,000 per year who live in the zone will receive a tax credit reimbursing the costs of the toll.³³

However, there is mounting pressure to expand the number of carveouts. Already, voters are reluctant to throw their support behind the plan, with up to 54 percent opposed and about 52 percent expressing skepticism about its effectiveness in reducing traffic.³⁴ Public opinion in New York mirrors that of other jurisdictions prior to their implementation of congestion pricing. In many cases, public support increased once pricing frameworks were implemented and congestion reduction and public transit improvement benefits were realized.

Outside New York state, two New Jersey congressmen are calling the congestion pricing plan a “double tax” on New Jersey commuters who already pay a toll on bridges entering the city, and are threatening to push for “cutting federal grants to MTA projects in New York” unless those commuters get an exemption.³⁵

Every exemption is critical. Using further analyses from the BTA, Charles Komanoff demonstrates that under the NYC higher-range plan, giving 10 percent of trips exemptions could result in a \$100 million drop in revenues for transit investment, a 44,000 hour daily decrease in traveler time savings, and nearly \$300 million in lost net benefits for New Yorkers.³⁶ Due to the complex nature of the urban transportation environment, each “vehicle’s occupation of Manhattan street space acts as a force multiplier of lost time for other vehicles on Manhattan streets.”³⁷

While many policymakers will be pressured to give carveouts to one group or another, the degree to which they stick to the plan will largely determine the success of the rollout.





Equity and Congestion Pricing

Large cities around the country are beginning to explore the possibility of implementing congestion pricing schemes. A key question they should ask themselves is: does our current transportation system enable residents from all economic backgrounds to access jobs and city amenities without cars?

The discussion around equity and congestion pricing is one that the city of Los Angeles is well acquainted with. The city has discussed congestion pricing at length and is currently undertaking a study to look at equity. Los Angeles Mayor Eric Garcetti, as well as the Metropolitan Transportation Authority board of directors, have spoken publicly about how the city's current public transportation system is not an adequate alternative to driving for many city residents.³⁸ Solving this problem will be crucial to developing a successful and equitable congestion model.

As other cities move forward on discussions around congestion pricing, they will have to weigh the benefits — less traffic, better air quality, reduced emissions, and much-needed funding for infrastructure, to name a few — with the costs to residents who don't have viable alternative modes of transportation. As a recent report from the Natural Resources Defense Council points out, there are options for cities that wish to both implement congestion pricing plans and expand access to public transportation.³⁹ As cities move forward with these plans, the question of equitable access to urban amenities must remain at the forefront.





Growing Cities and Congestion

The narrative of congestion pricing must not only include the cities currently suffering, but also growing cities so that they can avoid the same fate. While congestion pricing is primarily a tool being considered by large cities, smaller, growing cities should start thinking critically about their own policy options.

Southern cities in particular are growing extremely quickly. In southern cities with populations of fifty thousand or more, the average growth rate between 2007 and 2017 was 16 percent, compared to a national average of 12 percent. Texas and North Carolina are leading the pack, with 22 percent and 19 percent annual growth, respectively. Some western cities are also experiencing high rates of population growth, with Washington state leading the region. Between 2007 and 2017, Kirkland, Burien, Marysville and Renton all experienced at least

60 percent growth. Cities in Colorado, Idaho and Utah are also seeing higher-than-average rates of growth.

This growth is caused by a variety of factors, including housing affordability and job availability, and has not appeared to slow in recent years. Therefore, these cities will have the unique opportunity, as they continue to grow, to develop public transportation systems that can proactively decrease traffic.



Small Cities

Small- and medium-sized cities across the United States should remain open to the idea of congestion pricing. The city of Durham, England (population 48,069) and the town of Znojmo, Czech Republic (population 33,780) each have a congestion charge throughout their downtowns. Durham introduced its congestion charge in 2002 to reduce the traffic flow on their 1,000-year-old street, which runs through their downtown and leads to two of the city's World Heritage sites. A year after the charge was instituted, vehicle activity on the road fell by 85 percent. Using congestion pricing to reduce traffic towards heritage sites is also used in the larger city of Milan, Italy.

Conclusion – The Future of Congestion Pricing

Congestion pricing is a powerful policy tool that cities should explore. However, exploring congestion pricing may become more important as we move toward a future where both electric and self-driving vehicles are ubiquitous on city streets.

A car is a car, whether self-driving or people driven — taking up a great deal more space than buses, streetcars, or trains — so it's important to make sure the cost is right. Traffic has already increased in many cities due to widespread ride-hailing. Once Uber and others roll out autonomous vehicle fleets, calling a car will be cheaper and more competitive, and a potential burden on our streets.

In a new study, UC Santa Cruz Professor Adam Millard-Ball makes the case that self-driving cars will dramatically increase traffic. Millard-Ball forecasts that the number of cars on the street could grow exponentially as more people are able to take their hands off the steering wheel.

Furthermore, when not in use, autonomous vehicles need to go somewhere. There are three options: go back home, park somewhere or circle around. Most likely, these cars will endlessly circle the streets rather than parking and paying fees.

The rise in ride-hailing speaks to the need to think about congestion pricing in more dynamic terms. For instance, variable pricing could lead to autonomous vehicles making different decisions, and rather than ghosting through the streets waiting to pick up passengers, these cars could instead choose to park in either the core of the city or on the periphery. Variable pricing increases as traffic increases, thereby pushing some drivers — or in the future self-driving vehicles — off the road and making cars glide more smoothly. In this case, variable pricing could help to unclog streets.

Congestion pricing could directly counteract an increase in vehicle usage and ensure self-driving cars pay full freight for the impact they create. Congestion pricing can serve as a market-based regulator that gets the right number of cars on the street at a given time. At the same time, depending on the fuel mix of cars with gas versus electric, these systems could improve air quality and public health. And the funds from these plans can help support and improve transit systems.

Good, responsive public policy can help us make the right choices. Congestion pricing is a tool that, employed wisely and judiciously, could help make cities, towns and villages better for everyone. Local leaders resoundingly want cities for people, not cars.

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