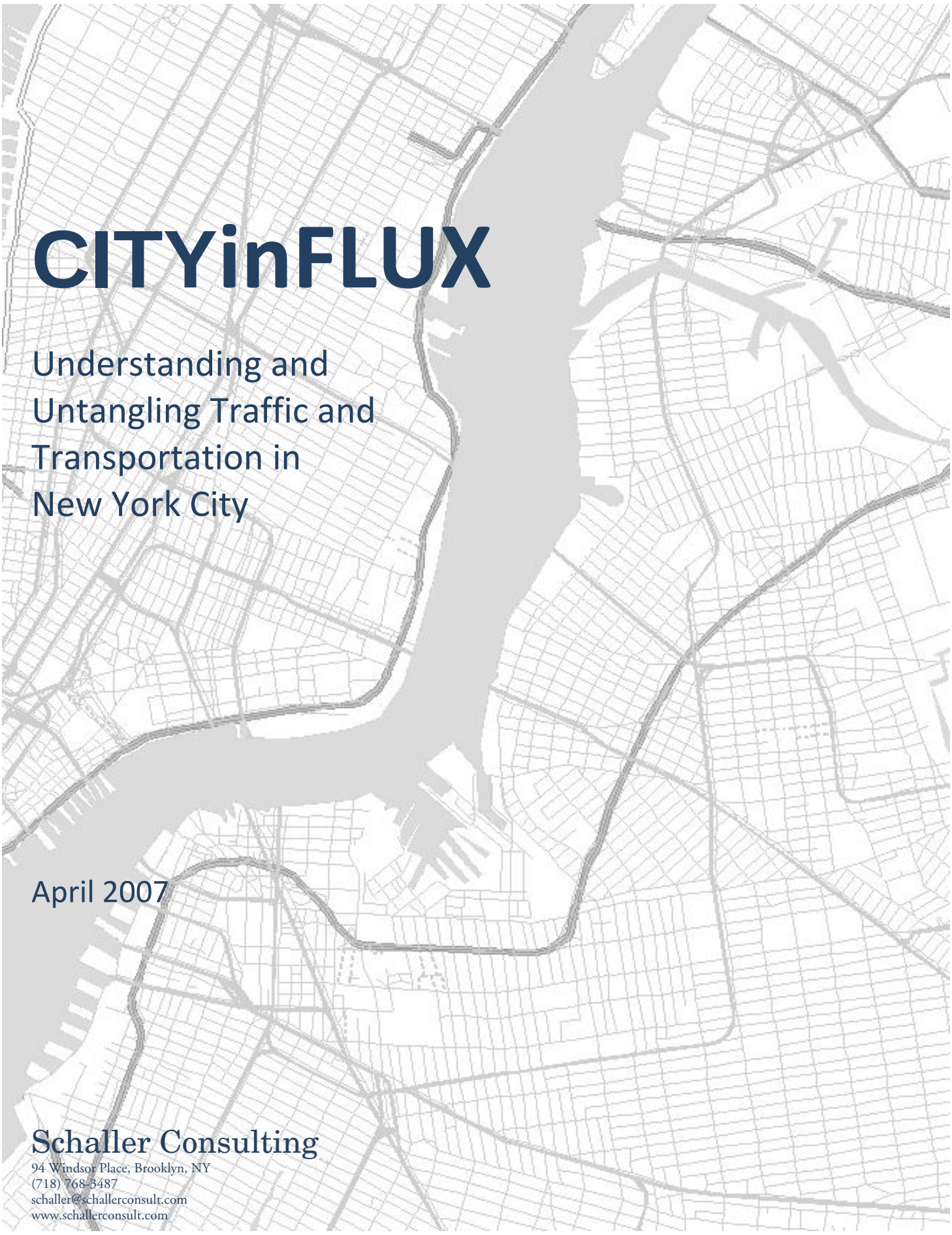

CITYinFLUX

Understanding and Untangling Traffic and Transportation in New York City

April 2007

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Summary

What should be done about traffic congestion in New York City? This question has become a focus of public discussion for a broad set of reasons. These include the economic costs of traffic congestion; the daily experience of traffic delay, crowding, stress and pollution from the overflow of traffic on the city's streets; and the impact of vehicular emissions on problems ranging from asthma rates to global warming. Every new high rise development brings additional traffic and in the public's mind highlights anew the need for action. The example of London, which imposed fees on vehicles in the center city and used the proceeds to expand bus services, provides tangible evidence of the benefits of action.

City and state governments appear ready to tackle these challenges. The Bloomberg Administration is scheduled to announce on April 22 a long-term sustainability plan in which traffic and transportation are expected to be central elements. At the state level, the new governor has appointed a transit head with a depth of experience in the city's traffic and transportation issues, affording an unprecedented opportunity for city/state coordination and cooperation.

The Mayor's sustainability plan comes on the heels of studies and reports that recommended a broad range of ideas for improving traffic and transportation. (See box on page iii.) This report synthesizes information and analysis from over 40 studies and datasets for the purpose of addressing two basic questions:

- What are the key facts about New York City's traffic and transportation problems?
- What types of policies should be pursued to address these problems?

This report is intended to help New Yorkers evaluate alternatives and direct their support toward proposals that make the most sense for the city.

Key findings of this analysis are:

- Traffic congestion is a quality of life, health and economic problem as well as an environmental problem. There are many reasons to address traffic issues.

- City residents experience traffic and transportation as major problems not just in Manhattan but throughout the city. New Yorkers believe the City is not doing enough and want to see action to reduce congestion and improve alternative modes.

- The primary source of traffic congestion in New York City is the private auto, more often than not driven by New York City residents. Policies to reduce traffic must address New Yorkers' auto use for commuting and other purposes.

- Manhattan and outerborough traffic problems are closely intertwined. Traffic congestion needs to be addressed on a citywide basis. Steps that reduce traffic congestion in Manhattan will have citywide benefits.

- In addressing traffic issues, policy-makers can take advantage of the fact that most trips in congested parts of the city are already by non-auto modes, and by the fact that drivers have alternatives to their car for the vast majority of auto trips. Transportation policy

should build on the city's already-extensive transit system to further emphasize non-auto modes.

- An effective and sensible plan to address traffic and transportation challenges will include a combination of steps that draw on three basic approaches:

    - ***Improving the attractiveness of non-auto modes***, by making public transportation, walking and cycling competitive with the auto on key attributes of speed, reliability, cost, comfort and safety.

    - ***Better utilizing existing street space*** by expanding bus and bike lanes, which carry more people per lane mile on existing streets than do cars, by reducing cruising for parking, which produces unnecessary congestion, and by improving street design and traffic management.

    - ***Adopting pricing policies for road use and parking*** that discourage unnecessary use of the auto, reduce through traffic in Brooklyn and Queens neighborhoods and fund public transportation improvements.

A key element of these findings is the need for a multi-faceted set of policies. There are several reasons for this. First, traffic and transportation problems are themselves multi-faceted. To take one example, traffic congestion in Midtown Manhattan stems from many sources: the large number of cars, taxis and commercial vehicles on the street; lanes blocked by double-parked delivery vehicles, turning vehicles and taxis making pickups and drop-offs; and pedestrian/vehicular conflicts at intersections. Solving Midtown's traffic woes requires addressing each of these sources of traffic congestion.

Second, an effective set of policies will be interdependent and mutually reinforcing. For example, congestion pricing and parking pricing policies would necessitate improvements to public transportation, both to handle increased ridership and to provide a viable alternative to the auto for residents of outlying areas of the city. Better utilizing street space through bus and bike lanes is important both to make these modes faster, safer and more convenient and thus more competitive with the auto, and to accommodate growth in their use.

Third, as a practical matter, it is important to make progress in cleaning up traffic in the short-term if longer-term policies are to gain public support. Progress on bus rapid transit on key corridors and enhancements to public transportation for commutes from outlying areas of the city, for example, can help build support for limiting car use.

Although even seemingly small changes to streets such as reducing on-street parking can spark sharp opposition, pricing policies are clearly the most controversial of the three approaches. Yet the city needs to consider pricing options for two reasons. First, current pricing policies work against the overall goal of reducing congestion and promoting the use of non-auto modes. For example, the presence of tolls on the Midtown and Battery tunnels but not the East River bridges encourages drivers to divert from the Interstate system to drive through residential and commercial neighborhoods. It will be difficult to solve traffic problems without correcting this type of perverse incentive.

Second, pricing is the most effective way to discourage auto use – even compared with multi-billion dollar investments in new subway capacity. Excluding pricing options from a program to address traffic congestion would sharply limit the amount of congestion reduction that can be

achieved. In addition, the revenues from pricing are important as a method of funding transit improvements that can help attract people from their cars.

A sensible program to reduce traffic and improve New Yorkers' transportation options should combine improvements to public transportation, walking and cycling with congestion pricing and parking pricing policies that discourage unnecessary driving and raise funds for public transportation.

The program should be citywide in scope, include short-term and longer-term elements, and pay particular attention to the transit needs of residents of outlying areas of the city.

A program with these features would be effective and equitable in improving the city's quality of life, reducing the stress and aggravation of traffic congestion, strengthening the city's economy and supporting the city's population and job growth.

A Compilation of Traffic and Transportation Options

- Congestion pricing in the Manhattan CBD with revenues used primarily for public transportation.
- Road pricing on expressways throughout the five boroughs.
- Market-rate pricing of on-street parking, with additional revenue used for local streetscape and sidewalk improvements.
- Bus lanes physically separated from other traffic.
- Bus lane enforcement cameras on buses.
- Bus rapid transit, including bus lanes, traffic signal priority, pre-boarding fare payment, GPS and real-time arrival information at bus stops.
- Additional express bus service from areas with long bus-to-subway commutes.
- Complete the planned NYC bicycle lane network.
- Bike parking and showers.
- Widen sidewalks.
- Traffic calming measures such as speed zones, speed reducers and extended pedestrian crossing times.
- Increase number of truck loading/unloading zones.
- Update zoning requirements for loading bays and freight elevators.
- Create freight consolidation zones on the edge of the city.
- Promote use of barges and rail freight.
- Mandate night time deliveries.
- Parking "cash-out" offered to employees who drive to work.
- Replace parking meters with Muni-meters throughout the city.
- Residential permit parking.
- Restricted left turns and some right turns on major arterials.
- Dedicated turn lanes.
- Enforce requirement that taxis pickup and drop off at the curb.
- Enforce "don't block the box," double-parking and other traffic rules.
- "All walk" phase in traffic signal cycle (so-called "Barnes dance")
- Park and ride lots at the end of subway lines.
- Limit government employee parking in Manhattan and downtown Brooklyn.
- Increase ferry service.
- Light rail, trolley or monorail systems in areas not currently served by rail.
- Facilitate greater use of LIRR and Metro North by city residents

See: PFNYC 2006; Citywide Coalition for Traffic Relief 2006; Mayor's Office 2007a; Mayor's Office 2007b; Schaller 2006

This report was written by Bruce Schaller, Principal of Schaller Consulting, a nationally recognized expert in transportation policy. His New York City work includes reports on congestion pricing, parking, why people drive in Manhattan; East River bridge tolls; bus rapid transit; suburban commuter access to Lower Manhattan; transit fare policy; taxicab regulation, transportation operations for special events; and transportation financing. His consulting clients have included the Metropolitan Transportation Authority, City of New York, Port Authority of New York and New Jersey, New York Metropolitan Transportation Council, New Jersey Transit, National Transit Institute, Federal Transportation Research Board, Transportation Alternatives, NYPIRG Straphangers Campaign and the Regional Plan Association.

Mr. Schaller is also a Visiting Practitioner at the Rudin Center for Transportation Policy and Management at New York University's Robert F. Wagner Graduate School of Public Service, and writes the monthly transportation topic page in GothamGazette.com. Prior to establishing his consulting practice in 1998, Mr. Schaller was Deputy Director of Marketing Research and Analysis at New York City Transit and worked at several New York City agencies.

Mr. Schaller has a Masters in Public Policy from the University of California at Berkeley and a B.A. from Oberlin College.

This report was produced as a public service and is intended to aid the city and New Yorkers in making improvements to the city's transportation system. The report is available at www.schallerconsult.com.

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Figures and Tables

Note:

The Manhattan Central Business District (CBD) is defined as the area south of 60th Street, river to river.

Data sources are indicated by references in brackets at the end of each bullet point. When the same source is used in bullet points immediately thereafter, the citation is not repeated. Full citations with additional relevant information is provided in the References section (see page 36).

1. The Costs of Congestion

Why focus on traffic and transportation? Out of the daily experience of traffic delay, crowding, stress and pollution from traffic, many New Yorkers view traffic congestion primarily as a quality of life problem. It is also, however, a health and environmental problem and an economic problem. Thus, there are a wide range of reasons to tackle the traffic tangle.

By various measures, congestion costs New Yorkers at least $10 billion a year.

- The economic value of time lost to recurring delay is estimated at $4 billion annually in New York City. Including an estimate for nonrecurring delay caused by accidents, adverse weather and other incidents, the value of time lost is over $10 billion annually. [NYMTC 2005]
- Traffic congestion also has a range of economic impacts from the increased cost of doing business (e.g., inventory, logistical and personnel costs), wasted fuel and reduced productivity. These economic costs are estimated at over $13 billion to businesses and consumers in the New York region. [PFNYC 2006]
- Due to congestion levels, freight shipment costs in the metropolitan region are double those of the national average. [NYMTC 2004]
- Excess congestion results in the loss of over 38,000 jobs in the New York region, including at least 15,000 in the Manhattan Central Business District. [PFNYC 2006]
- Four in ten small business owners in New York City said that their business operations are routinely hampered by transportation congestion or delays. The issue is most acute for manufacturing, wholesale and retail trade firms. [CBC 2005]

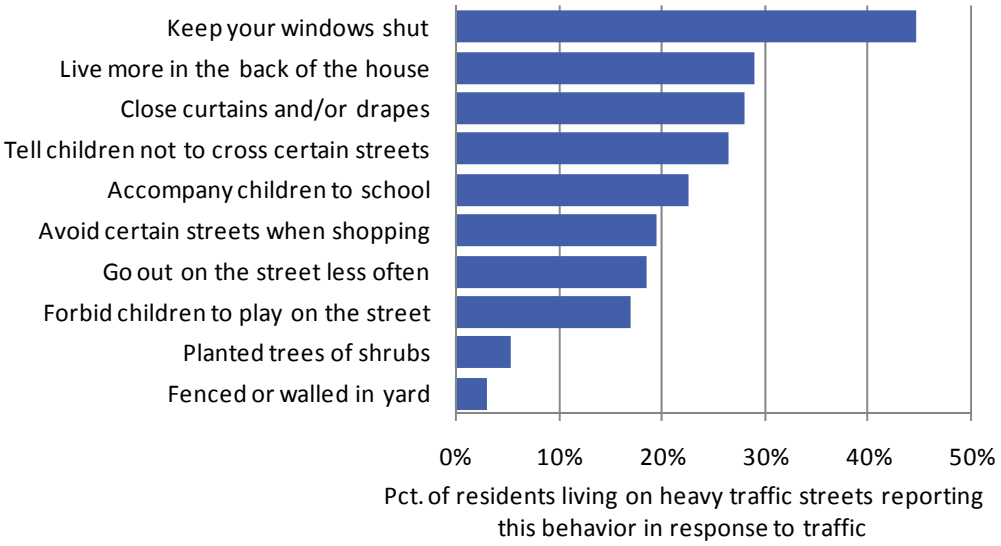
The costs of congestion are also seen in environmental and health effects …

- On-road vehicles account for 20% of New York City's total greenhouse gas emissions. [Mayor's Office 2007c]
- Over 2 million New York City residents live within 500 feet of a congested street or highway and are at higher risk for various diseases, including cancer, heart disease and respiratory ailments, as a result of their exposure to vehicle emissions. [Environmental Defense 2007]
- Studies of pregnant women in New York City found that prenatal exposure to polycyclic aromatic hydrocarbons (PAHs), a combustion-related air pollutant, is linked to chromosomal abnormalities that are associated with increased cancer risk and may adversely affect children's cognitive development. [Bocskay 2005 and Perera 2006]
- A study in the South Bronx found that asthmatic children are exposed to very high fine-particle concentrations on a "fairly regular basis" and is one factor contributing to high childhood asthma rates in the South Bronx. [Fernandez 2006]
- A study in Los Angeles found that children growing up within one-third of a mile of a freeway sustain reduced lung function. [Bakalar 2007]

… and the quality of life.

- New Yorkers living on streets with high traffic volumes are more frequently interrupted by traffic during sleep, meals and conversations and possess fewer relationships with neighbors than people living on lower-traffic streets. [Transp. Alternatives 2006]
- Traffic volumes affect how often New Yorkers keep their windows shut, how often they go out on the street and whether they tend to live toward the back of their house. (See Figure 1.)
- Congestion also affects when commuters rise in the morning and head for work. A survey of trans-Hudson commuters found that 22% choose their travel times to avoid congestion, such as rising early to "beat" the traffic. [Holguín-Veras 2005]

Figure 1. Effects of living on streets with heavy traffic, residents of four New York City neighborhoods, 2006



Source: Transp. Alternatives 2006

2. Public Perceptions

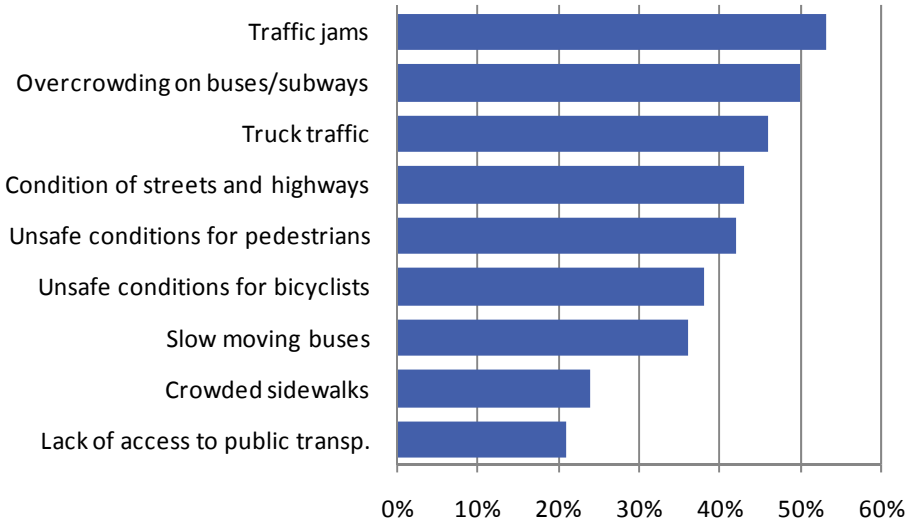
Restricting traffic is both politically attractive and politically perilous. Proposals ranging from tolling the East River bridges to setting up exclusive bus lanes have met with stiff public resistance for decades and gained few adherents among elected officials. But recent research shows that the public has an appetite for action on traffic and transportation issues – and suggests how to attract strong public support.

The public sees traffic congestion as a major problem citywide.

New York City residents feel traffic is a major problem in the city.

- 53% of city residents feel that "traffic jams and backups" are a "major problem." (See Figure 2.) [Michaels 2006]
- 45% of New York City residents say that traffic jams and backups are a problem in their own neighborhood.
- 59% of city residents feel that the city is doing a fair or poor job of reducing traffic jams, in contrast to 31% who feel the city is doing an excellent or good job.
- Congestion "provoked the greatest volume of public comments" to the Mayor's 2030 sustainability goals. [Mayor's Office 2007b]

Figure 2. "Major problems" in New York City, New York City residents, 2006



Source: Michaels 2006. Percent of New York City residents saying that each issue is a "major problem" on four-point scale (major problem, moderate problem, minor problem, not a problem).

The public favors a range of solutions, from lower speed limits to certain types of fees on motorists.

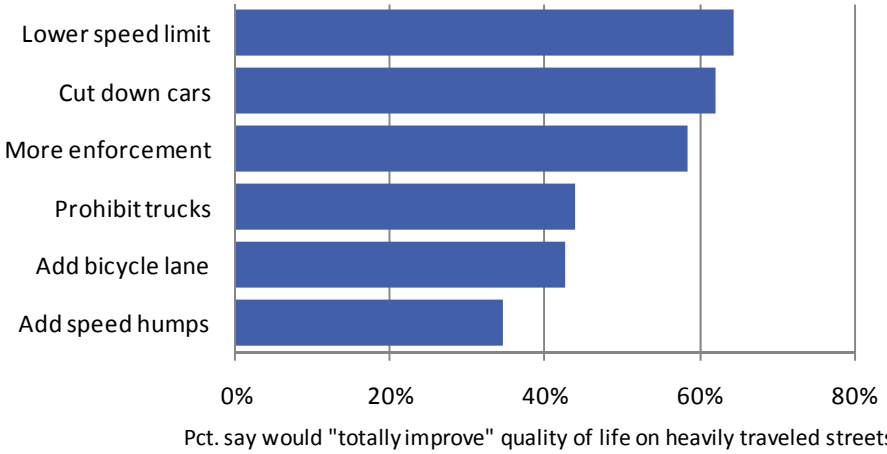
Traffic and truck restrictions, enforcement and bicycle lanes are endorsed as solutions to local traffic problems.

- 62% of residents of heavily trafficked streets said that slowing and reducing traffic would "totally improve" the quality of life on their streets, based on face-to-face interviews with residents in Chinatown, Brooklyn Heights, Astoria, Queens, and High Bridge, Bronx. (See Figure 3.) [Transp. Alternatives 2006]
- Other favored improvements range from more enforcement to adding speed humps.

Fees on motorists are supported by many New Yorkers.

- Community leaders "from virtually all boroughs" consulted by the Mayor's Sustainability Office recommended the implementation of congestion pricing and earmarking the money for transit improvements. [Mayor's Office 2007a]
- A public opinion survey of New York City residents found that 44% said that congestion pricing was a "good idea." [Michaels 2006]
- In a series of focus groups, New York area residents said they would support or consider supporting fees on motorists such as congestion pricing and tolled express lanes if the fees would reduce congestion, lead to enhanced transportation choices, affect people equitably, and if the revenues are applied to improving public transportation. [Schaller 2006]

Figure 3. Steps that would improve quality of life on busy streets, residents of four New York City neighborhoods, 2006



Source: Transp. Alternatives 2006

3. The Sources of Traffic

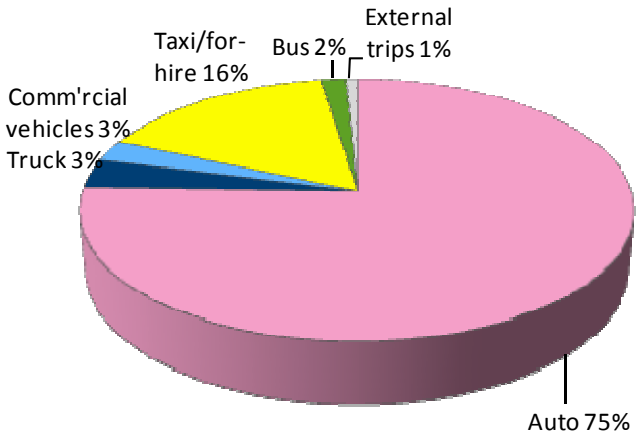
Each group of street users tends to view other groups as the source of congestion, pollution, aggravation and delays. Drivers point to truckers, truckers point to pedestrians, pedestrians point to cars and everyone points to taxis. On a geographic basis, many New York City residents assume that suburban commuters account for most of the traffic in the city, while others assume that auto commuters lack of transit alternative. Some of these are misconceptions while others are only one part of a larger story.

The auto is the main contributor to traffic congestion, except in the midday period in Manhattan.

Cars account for three-quarters of motor vehicle travel in the city.

- Autos account for an estimated 75% of vehicle miles traveled in the five boroughs. (See Figure 4.) [NYMTC BP model data]
- Autos comprise 74% of vehicles on East River bridges. [NYCDOT 2006a]
- Autos, vans and light trucks comprise 89% of vehicles using the Lincoln, Holland, Midtown and Battery tunnels into Manhattan. (Auto is not separated from vans and light trucks in these data.) [NYCDOT 2006b]

Figure 4. Vehicle miles traveled by mode, New York City, 2002

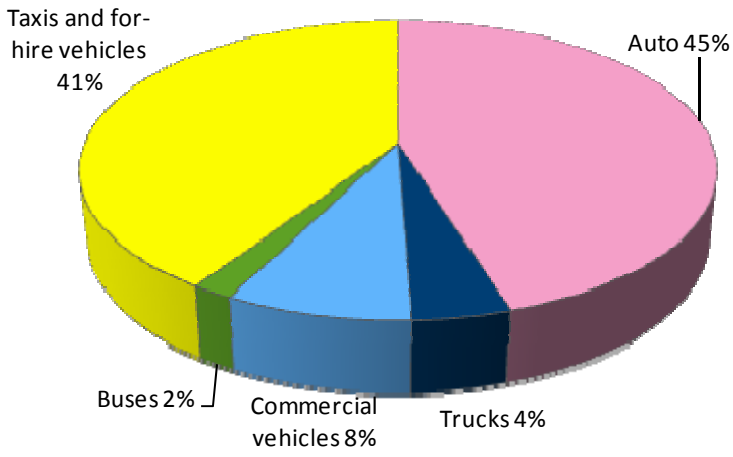


Source: NYMTC BP model data

Within Midtown Manhattan during the midday, autos comprise about one-half of vehicles circulating in traffic.

- Autos account for approximately 45% of vehicle miles traveled in Midtown Manhattan from 10 a.m. to 4 p.m. (See Figure 5.) [NYMTC BP model data]
- Taxis and for-hire vehicles comprise an estimated 41% of vehicle miles traveled in Midtown Manhattan during midday hours.
- Trucks, commercial vehicles and buses comprise lesser shares of traffic.
- Trucks and commercial vehicles take up more space than these figures suggest, however, given their larger size and their greater use of road space when they stop to make deliveries.

Figure 5. Vehicle miles of travel in Midtown Manhattan, midday hours, 2002

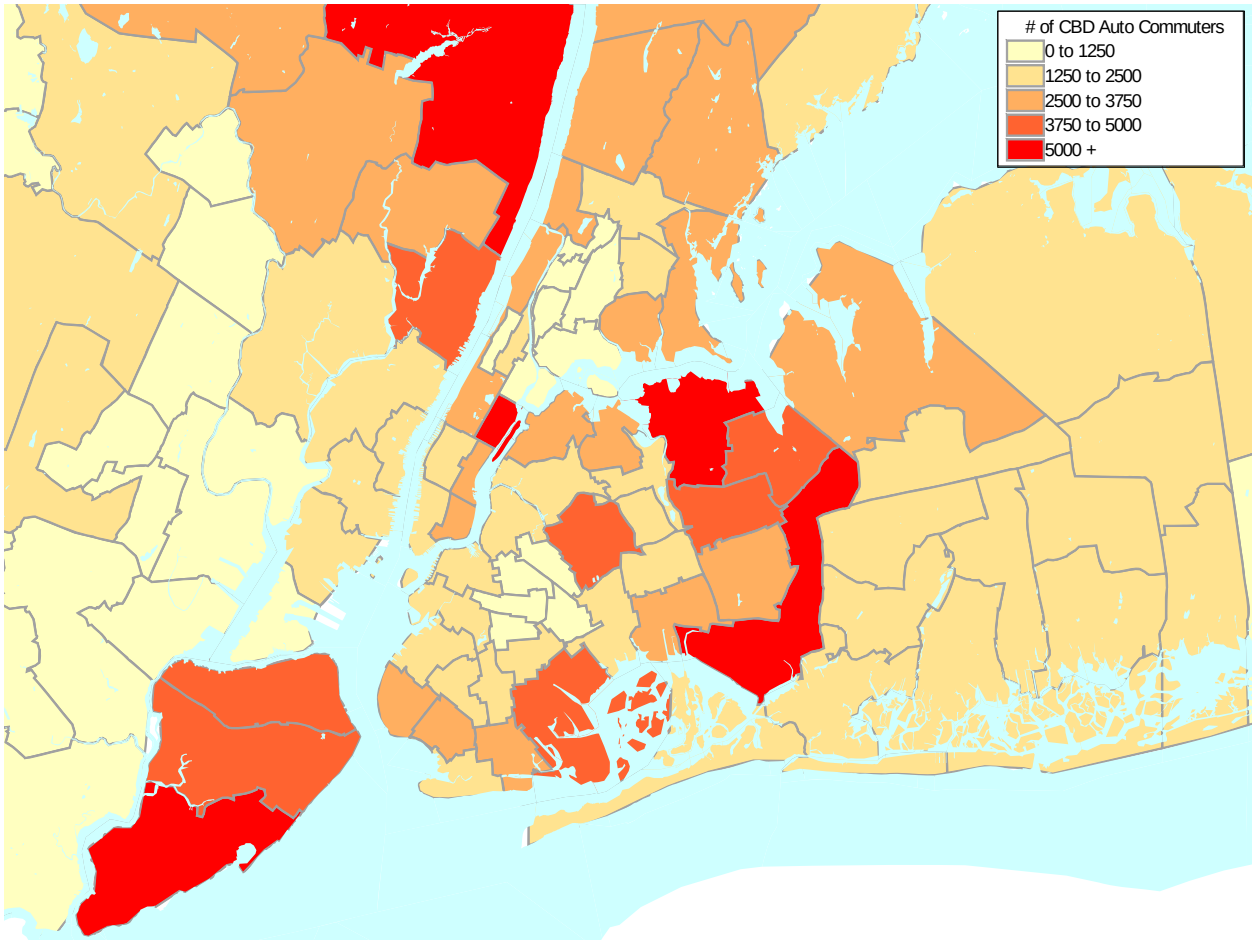


Source: NYMTC BP model data

Most drivers are New York City residents.

- New York City residents account for an estimated 80% of miles traveled in autos in New York City, while suburban residents account for 20% of auto miles traveled. [NYMTC HIS data]
- 50% of motorists interviewed in the Manhattan Central Business District (CBD) on weekday afternoons were city residents. [Schaller Consulting 2007b]
- Of the 267,000 people who commute by car to CBD jobs from the 40-county metro area, 53% live in the five boroughs of New York City. [2000 Census data]
- The greatest concentrations of auto commuters to the CBD live in eastern Queens, southeastern Brooklyn, Staten Island and Rockland County, NY and northeastern Bergen County, NJ. (See Figure 6.)

Figure 6. Number of CBD auto commuters, 2000



Source: 2000 Census data

4. Traffic's Citywide Scope

It is easy to think of traffic congestion in terms of the morning and afternoon rush hour into and out of the central business district. It is also easy to assume that traffic is growing most rapidly where it is most severe. Neither of these assumptions bears out in New York City today. The archetypal 9-to-5 commuter is only one strand in a traffic stream that prominently includes trips with destinations beyond the CBD and outerborough and off-peak traffic growth.

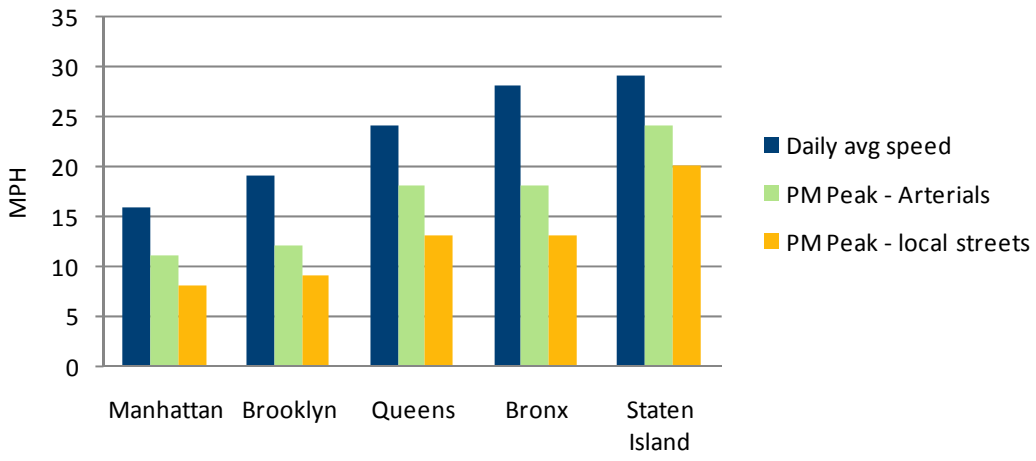
The many strands of the traffic stream mean that no solution that focuses solely on the 9-to-5 auto commuter will solve the city's traffic problems. But it is also true that addressing traffic congestion in Manhattan will have citywide benefits.

Traffic is bad not only in Manhattan, but in much of the rest of the city.

Traffic congestion is most intense in Manhattan . . .

- The average Manhattan traffic speed is estimated to be 15.8 mph at "normal" congestion levels. ("Normal" reflects everyday or "recurring" congestion but does not reflect the impact of traffic accidents, bad weather or events such as street closings that do not occur on a predictable basis.) (See Figure 7.) [NYMTC 2005]
- Speeds are lowest on local streets during rush hour, which experience average speeds of 8.1 mph in Manhattan.

Figure 7. Traffic speeds, 2005



Source: NYMTC 2005

… but congestion is a citywide problem.

- Traffic speeds are only somewhat higher outside Manhattan: speeds under normal conditions average 19 mph in Brooklyn, 24 mph in Queens, 28 mph in the Bronx and 29 mph on Staten Island. [NYMTC 2005]
- In much of the city, speeds average less than 12 mph during the afternoon peak period. (See Figure 8 on the next page.)
- "Excess congestion" – defined as traffic delay that damages the economy, going beyond high demand for road space that indicates a healthy economy – also shows the citywide nature of the congestion problem. Manhattan accounts for only 22% of "excess congestion" in New York City, compared with 21% each in the Bronx, Brooklyn and Queens and 16% on Staten Island. [PFNYC 2006]

Manhattan and outerborough traffic problems are intertwined.

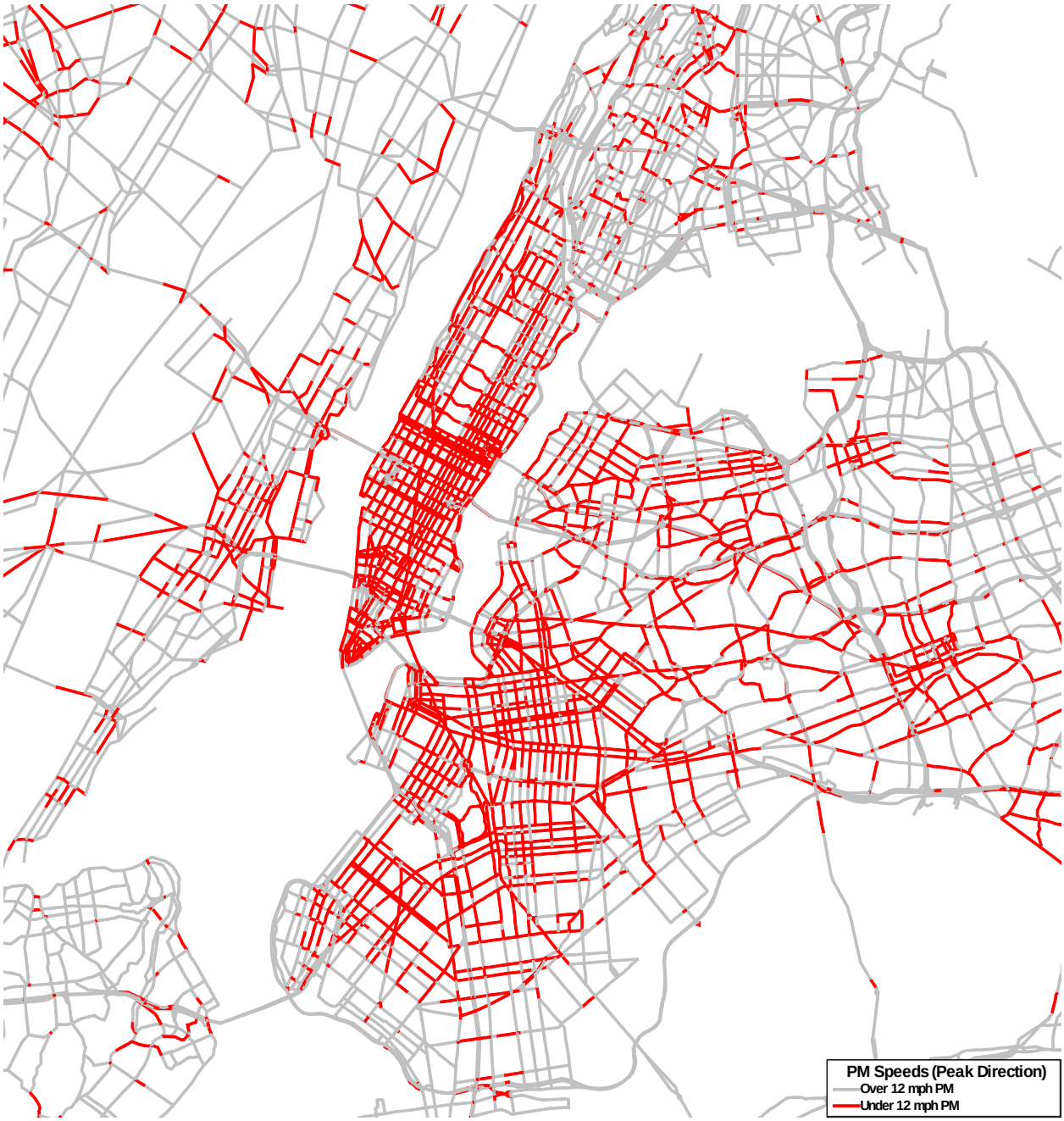
Manhattan-bound traffic is a major contributor to traffic congestion outside Manhattan.

- Over 43% of traffic in downtown Brooklyn is through traffic bound for Manhattan. [Schaller Consulting 2001]
- During the morning rush hour, 57% of traffic in Long Island City is bound for Manhattan.

Through traffic contributes substantially to Manhattan traffic congestion.

- Drivers whose trips originated outside the Manhattan CBD account for 39% of autos leaving the CBD via a bridge or tunnel between 1 p.m. and 6:30 p.m.. [Schaller Consulting 2007b]
- 38% of eastbound auto traffic through the Holland Tunnel was destined for non-CBD locations as was 31% of auto traffic through the Lincoln Tunnel. [PANYNJ 19 90]

Figure 8. Streets with speeds under 12 mph during the PM peak, 2002



Source: NYMTC BP model data. Speeds are for peak direction.

Traffic growth is primarily at off-peak hours and outside Manhattan.

With roads saturated at peak times, traffic growth into the CBD has concentrated in off-peak hours.

- Between 1993 and 2005, traffic volumes entering the Manhattan CBD increased in the early morning hours and in the afternoon and evening while being essentially unchanged during the morning peak period. (See Figure 9.) [NYCDOT CBD cordon data]
- Likewise, traffic leaving the CBD increased in the morning and early afternoon while being essentially unchanged during the evening rush hour. (See Figure 10.)

Figure 9. Change in number of vehicles entering the CBD, 1993-2005

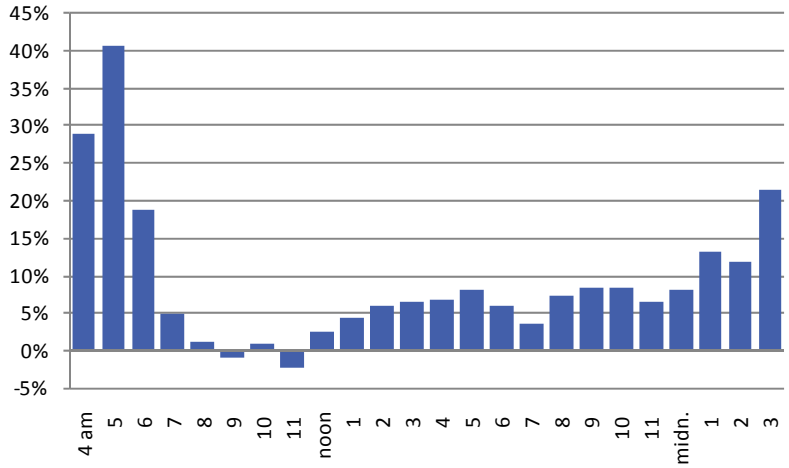
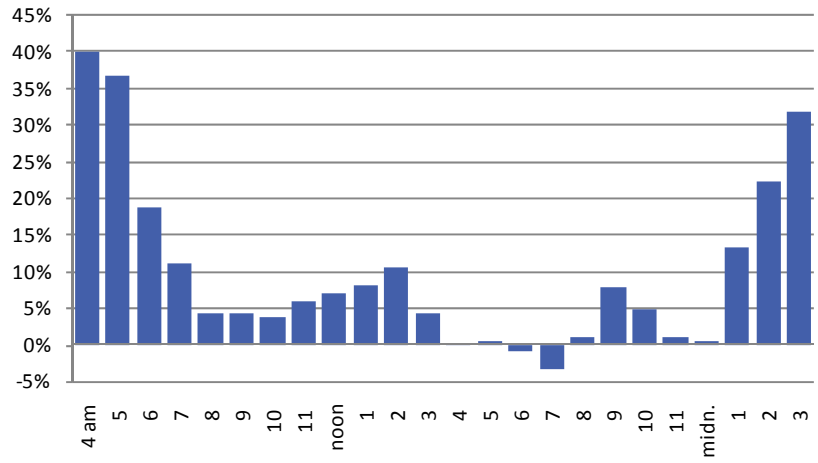


Figure 10. Change in number of vehicles leaving the CBD, 1993-2005



Source: NYCDOT CBD cordon data

Citywide, traffic has increased more rapidly outside the Manhattan CBD than in the CBD.

- Traffic volumes increased by 15% from 1993 to 2005 at measured locations outside the CBD, compared with a 6% increase for vehicles entering and exiting the CBD.
  (The non-CBD figure is based on traffic counts at all water crossings, at other city-operated bridges, and at the borders between Queens and Brooklyn, Queens and Nassau County and the Bronx and Westchester County.)
  [Schaller Consulting 2007a]

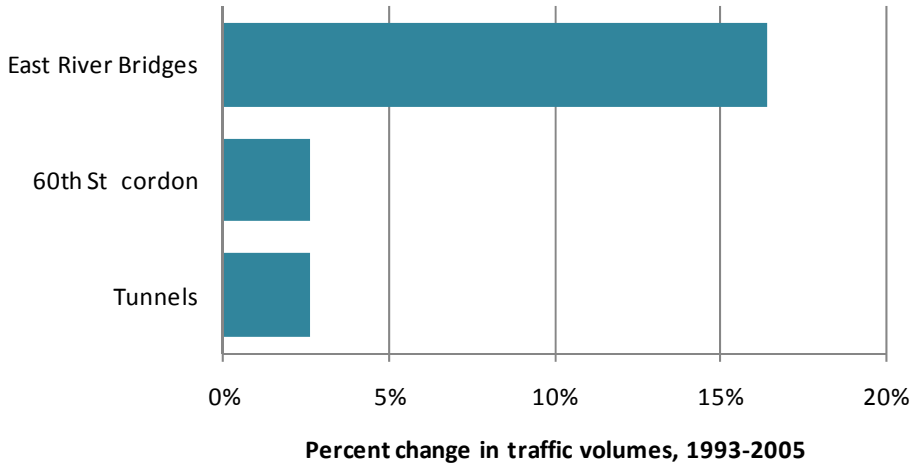
Motorists are increasingly taking advantage of free crossings into the CBD.

Traffic growth has been concentrated at the free East River bridges.

- Traffic volumes on the untolled East River bridges increased 16.4% from 1993 to 2005, compared with 2.6% at tolled crossings. Traffic volumes at the 60 Street cordon increased 2.6%. (See Figure 11.) [NYCDOT CBD cordon data]

- Traffic increases on East River bridges were concentrated at the Queensboro and Williamsburg bridges, in part because capacity increased as lanes were reopened with the completion of bridge reconstruction work.

Figure 11. Increase in traffic into the Manhattan CBD, 1993-2005



Source: NYCDOT CBD cordon data

5. The Auto in a Walking and Transit City

In most of the United States, people would have difficulty getting around without a car. Would policies that discourage, restrict or charge fees for auto use hamper mobility in New York City? Do drivers have viable alternatives to using their car?

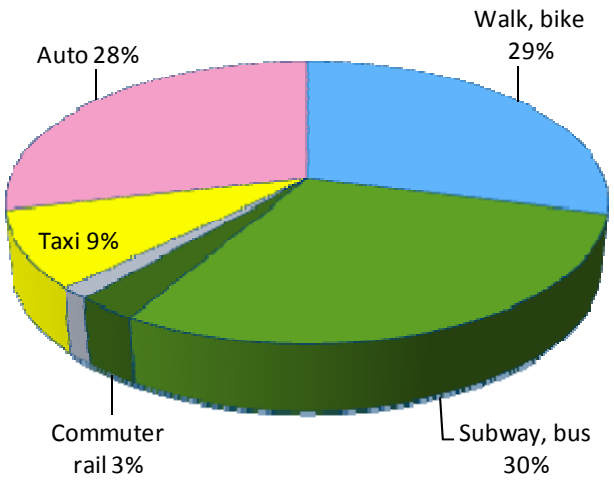
In addressing traffic issues, policy-makers can take advantage of the fact that most trips in congested parts of the city are already by non-auto modes, and by the fact that drivers have alternatives to their car for the vast majority of auto trips. Transportation policy can build on the city's already-extensive transit system to further emphasize non-auto modes.

New York is primarily a transit and walking city, with the auto only the third most-used mode citywide.

Citywide, 6 in 10 trips are by walking, transit or cycling.

- 33% of trips to New York City destinations are by subway, bus or commuter rail. (See Figure 12.) [NYMTC BP model data]
- 29% of trips are by walking or bicycle. (In addition and not included in this figure, walk is a common access and egress mode to the subway, bus and commuter rail.)
- 28% are by auto.
- Taxis and for hire account for 9% of trips.

Figure 12. Mode shares, New York City, 2002



Source: NYMTC BP model data. Based on journeys with New York City destinations.

Walking and public transportation account for the majority of all trips in four of the five boroughs ...

- The Bronx, Brooklyn, Queens and Manhattan all have walk mode shares of between 28% and 36%. (See Table 1.) [NYMTC BP model data]
- The subway/bus mode share in these boroughs ranges from 24% to 37%.
- The auto's share ranges from 13% to 33%.
- In contrast, two-thirds of Staten Islanders' trips are by auto, 15% by subway or bus and 12% by walking or bicycling.

... and an even larger share of trips into the Manhattan CBD.

- 70% of trips entering the CBD that have CBD destinations are by public transportation. [NYMTC HIS data]
- 22% are by auto (excluding taxi and for-hire).
- 4% are walk trips.

Within the Manhattan CBD, walking predominates.

- 70% of person trips within the CBD are walk trips. [NYMTC HIS data]
- 17% are by transit.
- 6% are by auto.

Table 1. Mode shares by borough, home-based journeys, 2002

	Bronx	Kings	Man-hattan	Queens	Staten Island	Citywide
Walk, bicycle	36%	34%	34%	28%	12%	31%
Subway, bus	24%	31%	37%	27%	15%	29%
Auto	29%	26%	13%	33%	66%	28%
Taxi and for-hire	8%	8%	15%	7%	4%	9%
School Bus	1%	1%	1%	2%	3%	1%
Commuter rail	2%	0%	0%	3%	0%	1%
Total journeys	100%	100%	100%	100%	100%	100%

Source: NYMTC BP model estimates. Home-based journeys are round trips beginning at home that include a destination and possibly stops along the way.

Transit is the main mode for CBD commuters.

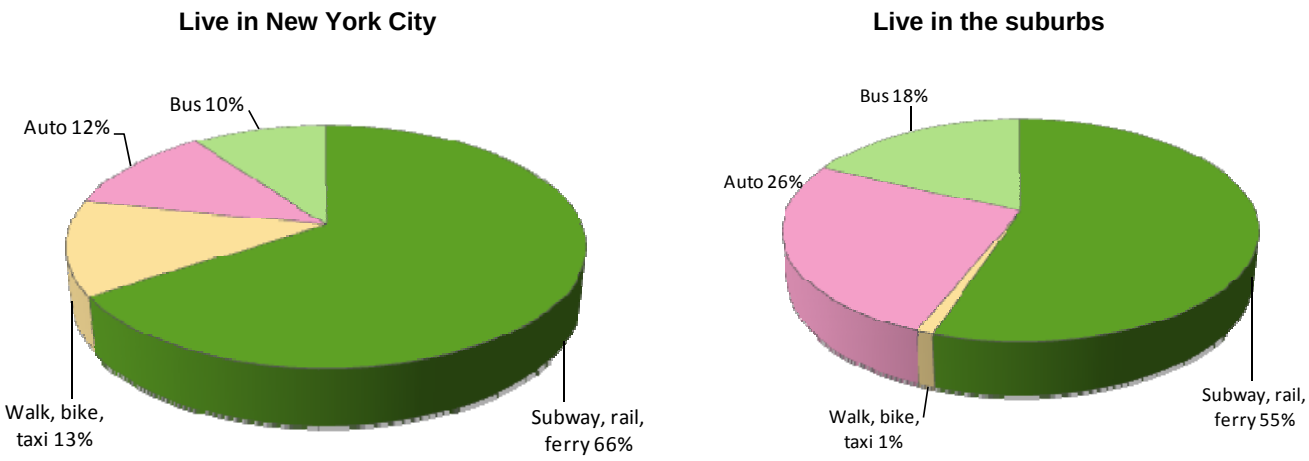
Most city residents use the subway or bus to get to work in the CBD.

- 76% of city residents who work in the CBD take public transportation (66% subway, commuter rail or ferry and 10% bus). (See Figure 13.) [2000 Census data]
- 13% walk, bike or take a taxi.
- 12% commute by auto.

Most suburban commuters use commuter rail or bus to get to CBD jobs.

- 73% of suburban CBD commuters take public transportation (55% commuter rail, ferry or subway and 18% by bus). (See Figure 13.) [2000 Census data]
- 26% commute by auto.
- 1% walk, bike or take a taxi.

Figure 13. Mode shares for CBD workers, 2000

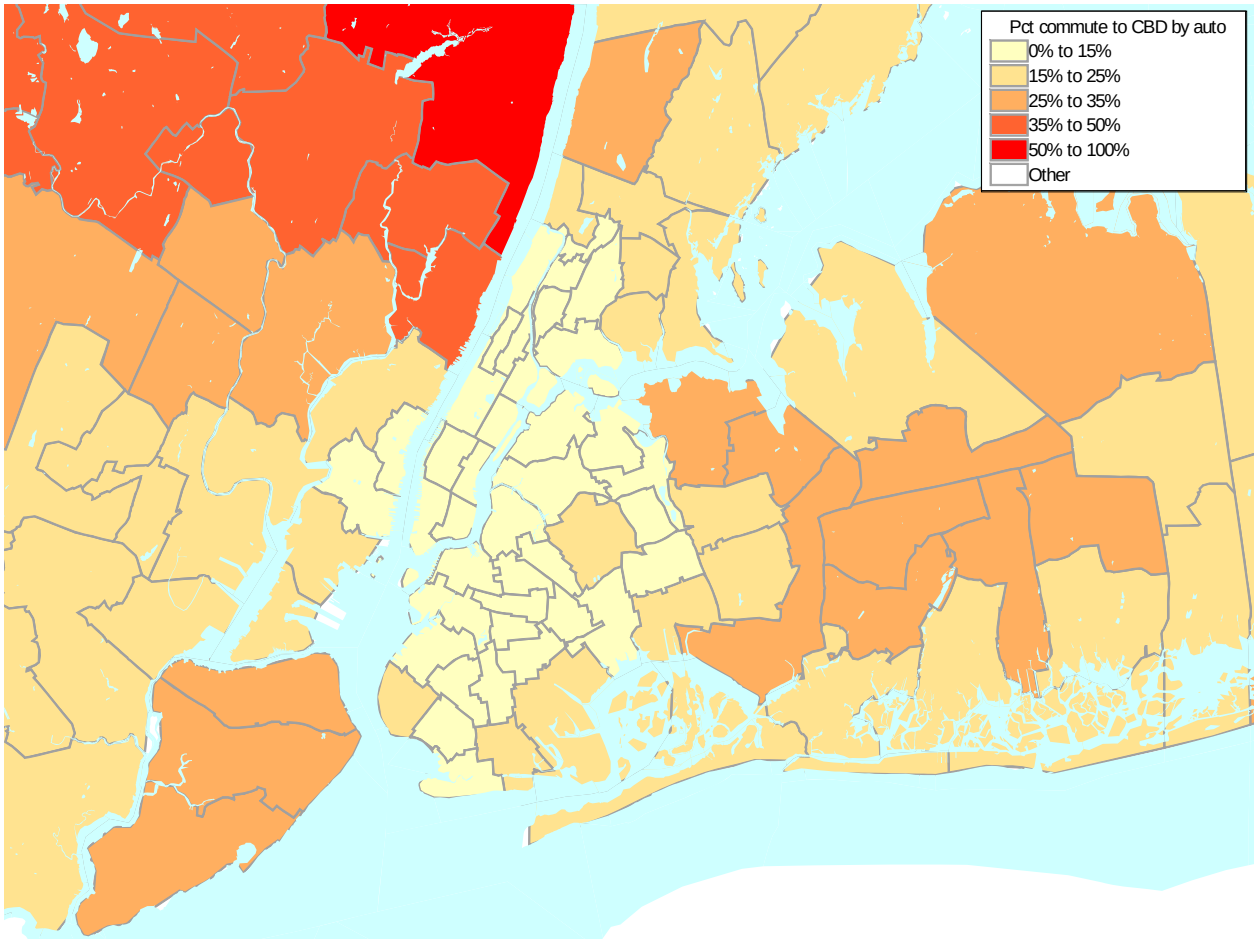


Source: 2000 Census data

Throughout the city and most of the suburbs, most commuters take public transportation to CBD jobs.

- Even in neighborhoods in eastern Queens and Staten Island that have the heaviest concentrations of auto commuters, fewer than one-third drive to their CBD jobs. (See Figure 14.) [2000 Census data]
- Only in parts of Rockland County and northeastern Bergen County, NJ – areas with slow transit service – do a majority of CBD commuters drive to work.

Figure 14. Percentage of CBD commuters who commute by auto, 2000



Source: 2000 Census data

The large majority of CBD workers have a viable transit alternative.

- While the greatest concentrations of New York City auto commuters live in neighborhoods beyond walking distance of a subway station, 61% of city residents who commute by auto live within two-thirds of a mile of a subway or commuter rail station. [Schaller Consulting 2006a]
- For the region as a whole, 80% of auto commuters have a transit option that would take no more than 15 minutes longer than their auto trip.
- Only 10% of auto commuters travel between home and work areas in which the auto is the typical way to get to work in the CBD.

The auto predominates only for city residents who work in the suburbs.

- 71% of New York City residents who work in the suburbs drive to work. [2000 Census]
- 17% take the subway, commuter rail or ferry.
- 8% take the bus.

Data puzzle:

How do 810,000 vehicles use only 138,000 parking spaces?

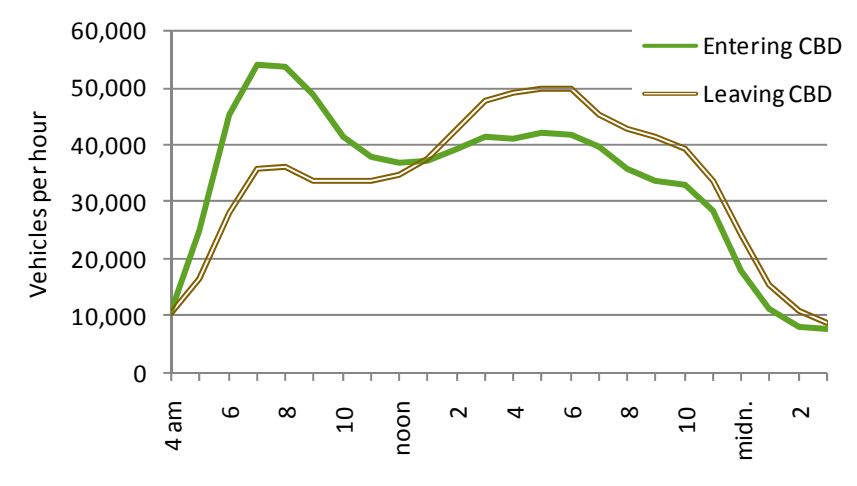
"Hub bound" traffic data show that in 2005, 810,000 vehicles entered the Manhattan CBD on an average fall weekday. But where do these vehicles go if, as City Planning Department data show, there are only 138,00 parking spaces in the CBD?* [NYCDOT CBD cordon data; Shoup 2005; Schaller Consulting 2007b]

The basic fact is that only a fraction of the 810,000 vehicles enter the CBD in the morning, park for the day and then leave. As Figure 15 shows, outbound traffic volumes are substantial throughout the morning and surpass inbound flows after 1 p.m. Many of the vehicles are not autos, and many either do not park at all or for very long:

- About one-third of vehicles entering the CBD are trucks, other commercial vehicles or taxicabs. (Hub bound data count the number of vehicle entries and thus count cabs in particular repeatedly during the day.)
- Of autos entering the CBD, 30% to 40% are making through trips – e.g., Brooklyn to New Jersey, the Bronx to Queens – and never stop or park in the CBD. [This estimate is based on Schaller Consulting 2006a; Schaller Consulting 2007b; PANYNJ 1990]
- Many drivers only park for a few hours and thus a single space accounts for several vehicles; a recent survey found that 41% of drivers park for four hours or less. [Schaller Consulting 2007b]
- 4% of drivers stopped but did not park in the CBD. [Schaller Consulting 2007b]

Total vehicle accumulation (vehicles entering minus vehicles leaving) peaks at around 100,000 vehicles total in the early afternoon. Add in CBD residents who park on the street, and the number of vehicles in the CBD at any one time is roughly commensurate with total parking spaces.

Figure 15. Inbound and outbound CBD traffic volumes, 2005



*Note that the 138,000 parking spaces figure excludes accessory parking provided in apartment buildings.

6. Attracting People from Auto to Transit

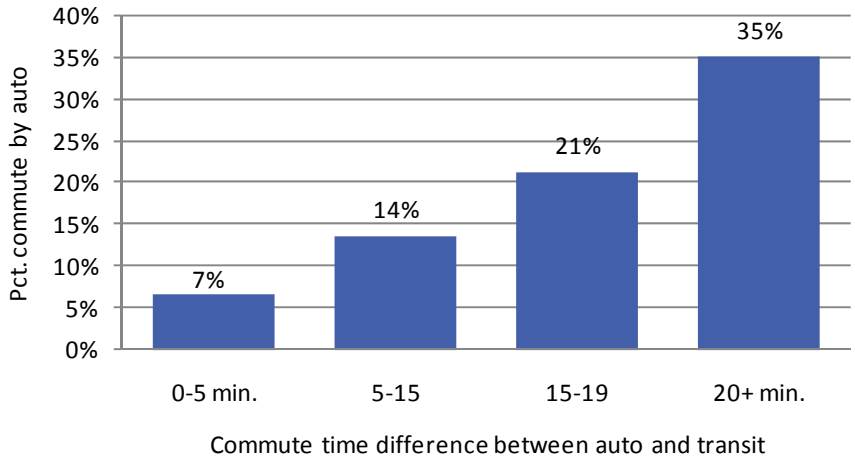
While users have strong views about numerous facets of the city's transportation system, mode choice is in the main governed by only a handful of factors. The most important are availability, speed, reliability of travel times, cost, comfort and personal security. Research and recent history shows that each of these are powerful levers subject to public policy decisions. Thus, auto users can be attracted from their cars if alternative modes are available for the trip, competitive on speed and reliability, attractive in cost and acceptable in terms of safety and comfort.

Travel time differences are a key factor in whether people drive or take public transportation to work.

The auto mode share is very low when transit offers competitive travel times to work but grows when the auto offers travel time savings.

- In areas of the city where the car's travel time advantage is less than 5 minutes, only 7% of commuters drive to work. (About one-quarter of CBD workers have these commutes.) (See Figure 16.) [2000 Census data]
- 35% commute by car when the auto commute is at least 20 minutes faster than the transit commute. One in 20 city commuters are in this group. Most of these commutes are from eastern Queens, northern Bronx and Staten Island to workplaces in lower Manhattan or above 14 Street near the waterfront.

Figure 16. Effect of auto/transit travel time difference on auto commute share, New York City residents, 2000



Source: 2000 Census. This figure is based on a detailed analysis of CBD commuters' trips to work, comparing travel time by car and public transportation for 161 home and workplace pairs for New York City residents working in the CBD. By comparing the same home-to-workplace trips across modes, results produce an apples-to-apples comparison of modes.

- 21% commute by car when the travel time differential is 15 to 20 minutes (one in ten CBD commuters living in the city have these commutes).
- 14% of CBD workers commute by car when the travel time differential is between 5 and 15 minutes. (Just over one-half of CBD workers living in the city have these commutes.)

A bus/subway transfer, which reduces travel time reliability, also shifts some people to the car.

- Auto has a 33% mode share among CBD workers who live in eastern Queens, Staten Island and other areas that are beyond direct subway access, and for which the travel time differential between auto and transit is at least 15 minutes. [2000 Census data]
- In contrast, auto has an 18% share in areas such as the northern Bronx that are proximate to a subway station but still have a travel time differential between auto and transit is at least 15 minutes.

In the suburbs, rail and bus attract most commuters to the CBD because they offer competitive travel times.

- Metro North attracts 76% of suburban CBD commuters who live east of the Hudson and within about 2 miles of a Metro North station. (See Table 2.) [2000 Census data]
- Metro North travel times are very competitive with the auto. The average Metro North commuter spends 72 minutes getting to work, about 10 minutes more than the average driver who makes the same commute.
- The Long Island Rail Road has a lower mode share and slightly longer commute times relative to the car. The LIRR attracts 71% of suburban commuters to the CBD who live within about 2 miles of an LIRR station. The average rail commute takes 12 minutes longer than the comparable auto trip.
- West-of-Hudson Metro North commuters have commutes that are 19 minutes longer than the comparable auto trip; Metro North attracts only a 24% market share of commuters from this area.

Table 2. Commute times and mode shares, suburban commute to the Manhattan CBD, 2000

	Rail commute time	Time savings if drove instead	Mode shares for commuters living within 2 miles of rail station				
			RR	Bus	Auto	Other	Total
Metro-North - east of Hudson	72	10	76%	3%	20%	0%	100%
New Jersey Transit	73	10	49%	26%	25%	1%	100%
Long Island Rail Road	79	12	71%	2%	26%	1%	100%
Metro-North - west of Hudson	97	19	24%	26%	50%	0%	100%

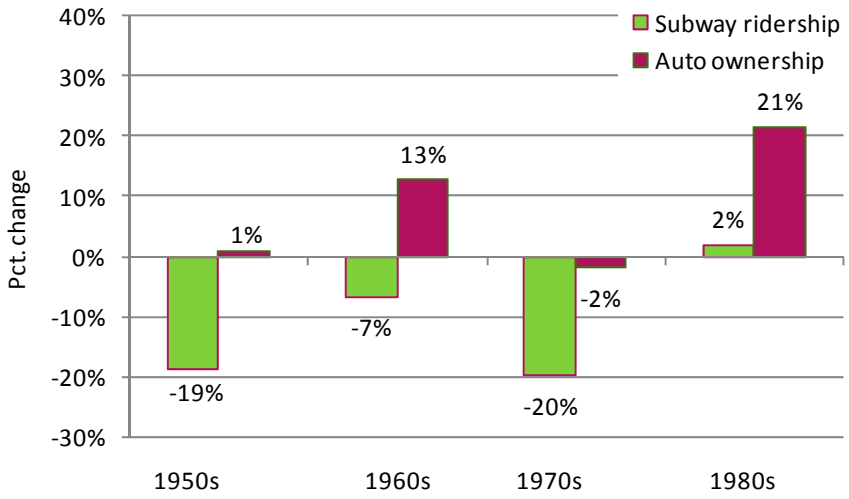
Rail commute times are for CBD commuters. "Time savings if drove instead" is based on commute time of drivers for the same origin and destination pairs, weighted by number of rail commuters. Source: 2000 Census data.

Trends over the past half-century show the impact of public investment on mode choice, as first auto travel and then transit ridership grew more rapidly.

Prior to the 1990s, travel shifted from public transportation to the car.

- Attracted to the roads by Robert Moses-era highways, from the 1950s through the 1980s auto ownership consistently outpaced changes in transit ridership. (See Figure 17.) [Schaller Consulting 2001]
- Even with the beginning of the subway system's recovery in the 1980s, subway ridership inched up by only 2% and bus ridership declined. Auto ownership increased by 21% and traffic volumes grew by an estimated 27% in the 1980s.

Figure 17. Changes in auto ownership and subway ridership, New York City, 1950s to 1980s



Source: Schaller Consulting 2001

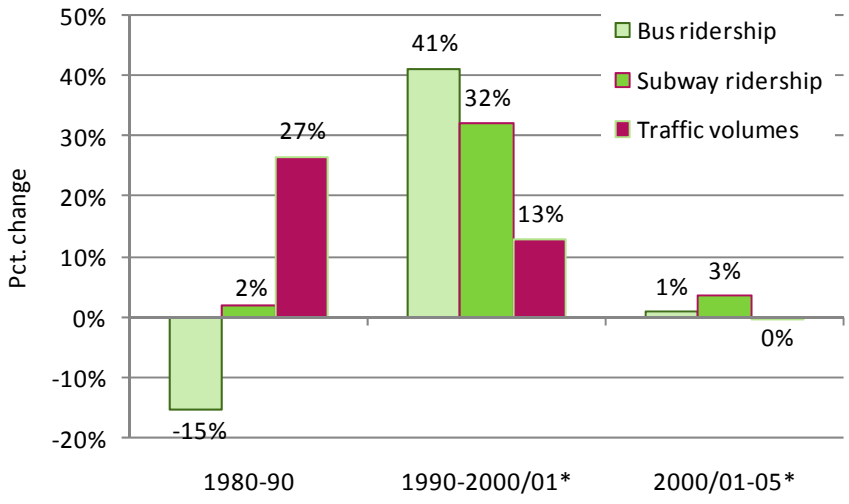
But in the 1990s, after billions of dollars were invested in rebuilding and upgrading subway and bus service, public transportation ridership grew more quickly than auto travel.

- This investment made subway and bus service more reliable, cleaner, more comfortable and safer. MetroCard fare incentives eliminated the two-fare zones, introduced 30-day, 7-day and one-day unlimited ride passes and offered discounts for purchase of 10-ride fare cards.
- The results were dramatically seen in ridership growth: in the 1990s, subway ridership increased by 32% and bus ridership by 41%, compared with a 13% increase in auto trips. (See Figure 18.)

Mode shifting has stalled since 2001, however, with little change in either traffic levels or transit ridership.

- The early-2000s recession and a transit fare increase in 2003 dampened trip-making in all modes.
- Subway ridership increased by 3% from 2001 to 2005 and bus ridership by 1%. (See Figure 18.) [Schaller Consulting 2007a]
- Traffic at measured locations throughout the city has been unchanged since pre-9/11 (comparing the fall of 2000 and the fall of 2005).

Figure 18. Changes in auto, subway and bus trips, 1980-2005



*Traffic is measured to the fall 2000 peak and subway and bus ridership to the annual 2001 peak.
Sources: Schaller Consulting 2001, Schaller Consulting 2007a and ridership data provided by NYC Transit.

7. Better Utilizing Street Space

Street space is inherently limited unless one widens streets by tearing down or moving buildings, as was done in Paris under Baron Haussmann or in Moscow under Stalin. But while street space is limited and many streets are near their vehicular capacity, they operate far below their people-carrying capacity. Reducing wasteful use of the street space, moving people to more efficient modes of travel such as buses and bikes, and better managing the traffic flow are important opportunities to reduce traffic.

Drivers searching for parking unnecessarily increases traffic volumes.

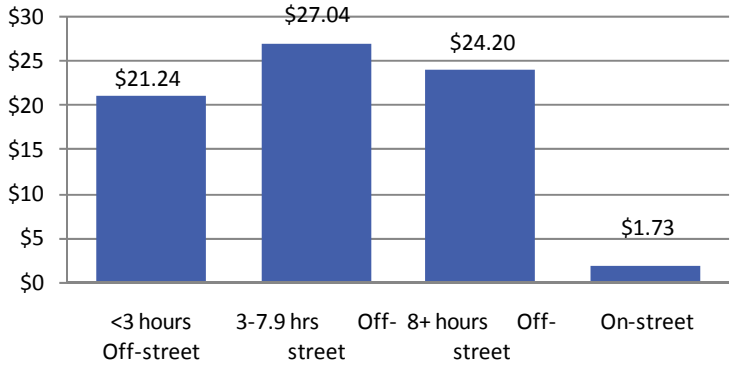
Drivers searching for parking comprise a substantial portion of vehicles on the streets.

- Drivers searching for a metered space constituted 15% of vehicle miles traveled in Midtown west of 5 Avenue during the midday period. [Falcocchio 1995]
- 28% of motorists interviewed in SoHo were looking for parking, rising to 41% on Saturday afternoons. [Schaller Consulting 2006b]
- Motorists searching for parking comprised 45% of vehicles on 7 Avenue in Park Slope, Brooklyn. [Transp. Alternatives 2007]

… as drivers search for cheap but scarce on-street parking.

- The average cost of parking on-street at a meter is $1.73 compared with $21 to $27 (depending on duration) for off-street parking in the Manhattan CBD. (See Figure 19.) [Schaller Consulting 2007b]
- Curb occupancy rates averaged 85% in the late morning and close to 95% in the early afternoon in selected areas of Midtown and Downtown Manhattan; search times for a space averaged 7.3 minutes in the morning and 10.6 minutes midday. [Falcocchio 1995]
- Curb occupancy averaged 97% between 10 a.m. and 4 p.m. in Brooklyn Heights, Boerum Hill and Fort Green and 94% at metered spaces in Park Slope. [Nelson/Nygaard 2006 and Transp. Alternatives 2007]

Figure 19. Parking costs for motorists parking in the CBD, 2007



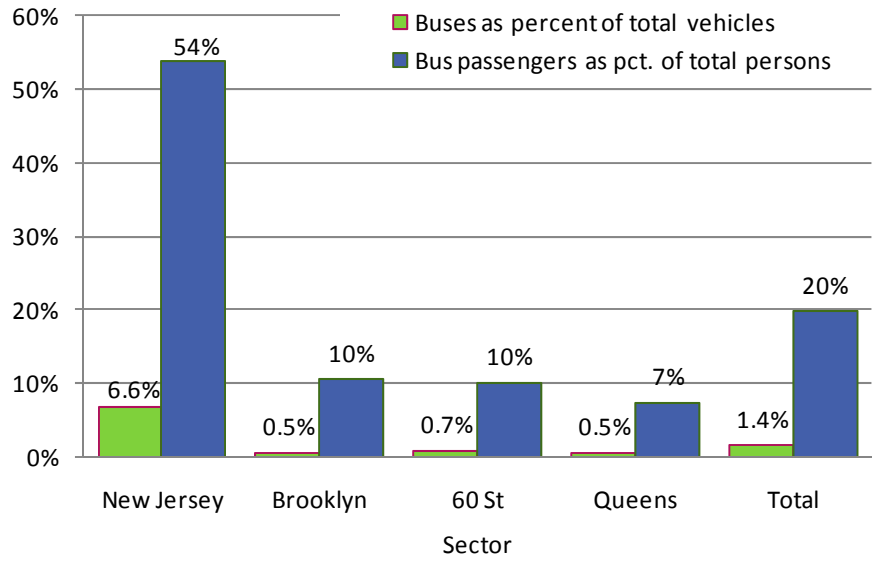
Source: Schaller Consulting 2007b

Increased reliance on buses and bicycles greatly increases the people-carrying capacity of streets.

Buses use street space far more efficiently than cars.

- Buses use one-tenth as much space per person as compared with autos. [Pushkarev 1975]
- Buses account for 20% of persons entering the CBD by motor vehicle, while accounting for only 1.4% of all vehicle entries. (See Figure 20.) [NYMTC 2006]
- Buses transport a majority of people crossing the Hudson River into the CBD (54%), while comprising only 6.6% of vehicles entering across the Hudson.
- Buses are more efficient modes on highways as well. The Staten Island bus lane moves more people in the morning and evening peak periods and at faster speeds than the general purpose lanes next to it, even though motorists perceive the bus lane to be underutilized. [Tri-State 2006]
- 85% of autos used to commute to the CBD are single-occupant vehicles. [2000 Census]

Figure 20. Buses and bus passengers as percent of vehicles and persons entering the Manhattan CBD, 2004

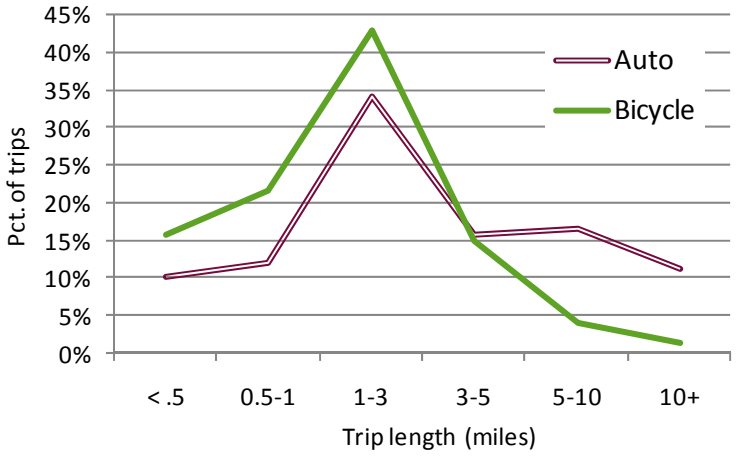


Source: NYMTC 2006

Bicycles are an efficient mode that could replace many short auto trips.

- 10% of auto trips are under one-half mile, 22% are under 1 mile and 56% are under 3 miles – distances readily served by bicycle. (See Figure 21.) [NYMTC HIS data]
- New York City's bicycle master plan found that potential cyclists want on-street bicycle lanes, secure bike parking and facilities to shower and change clothes. [NYCDOT 1997]
- 10% of downtown Brooklyn office workers surveyed said they would use bike racks, lockers and showers if provided by their employer. [Downtown Brooklyn Council 2005]
- Other dense North American cities that have invested in the bicycle infrastructure have higher bike-to-work mode shares than New York: 1.4% commute by bicycle in San Francisco, 1.7% in Madison, Wisconsin, and 1.9% in Vancouver and Ottawa, compared with 0.4% in New York. (Figures are for metro areas.) [Pucher 2006]
- Western European cities have achieved far higher levels of cycling, averaging about 5% to 10% of urban trips and reaching highs of 25% of trips in Denmark, 18% in the Netherlands and 11% in the former West Germany.

Figure 21. Auto and bicycle trip lengths, trips in New York City, 1997-98



Source: NYMTC HIS data

Street design and traffic management can be effective in improving traffic flow.

Restrictions on traffic such as turn restrictions, HOV requirements, construction embargoes and deployment of traffic officers can increase speeds and safety.

- The "Thru Streets" program, begun in the fall of 2002, prohibits both left and right turns off nine designated cross town streets in Midtown. A NYC Department of Transportation report found that the restrictions increased both speeds and traffic volumes on Thru streets and reduced the number of accidents. Speeds and traffic volumes increased on other cross town streets as well. [NYCDOT 2004]

- In the November/December holiday season in 2004, DOT implemented restrictions on the use of the Central Park drives. The restrictions included closure of several entrances, a reduction in the speed limit from 30 mph to 25 mph, and implementation of a HOV 2+ (cars must have two or more passengers) restriction on the West Drive in Central Park from 7 a.m. to 10 a.m. [NYCDOT 2005a]

- DOT studied the effects of these traffic changes and reported that fewer vehicles used the park drives, but without increasing traffic volumes on surrounding streets, and, for the most part, without reducing traffic speeds.

- The DOT report concluded that the Holiday plan was a success: "The project met or exceeded expectations for improving mobility, promoting alternative modes of transportation and improving safety without adversely affecting traffic conditions."

- For the "Gates" exhibit in Central Park in February 2005, DOT and other city agencies undertook significant efforts to manage the traffic impacts of the full closure of the Central Park drives, including a construction embargo and deployment of extra traffic officers. [NYCDOT 2005b]

- Due to effective management of traffic outside the park, traffic speeds increased even with the higher traffic volumes. A DOT report concluded that, "Despite significant increases in vehicular volumes, the city's Traffic Management Program helped to minimize vehicular travel time delays."

8. Pricing Incentives

Although people are accustomed to paying subway fares, tunnel tolls and parking fees, they resist the idea of paying to use parts of the transportation system that are now free. The result is a system in which the cost of travel, which should give incentives to use more-efficient and less-polluting modes, sometimes encourages people to drive. Some of the incentives, such as East River tolls that encourage people to drive through residential neighborhoods rather than stay on the Interstate highway system, are almost bizarre.

When properly implemented, pricing is a highly effective way to reduce traffic, discourage unnecessary use of the auto, reduce neighborhood traffic and improve public transportation options. Although controversial, it is an important mechanism to untangle traffic.

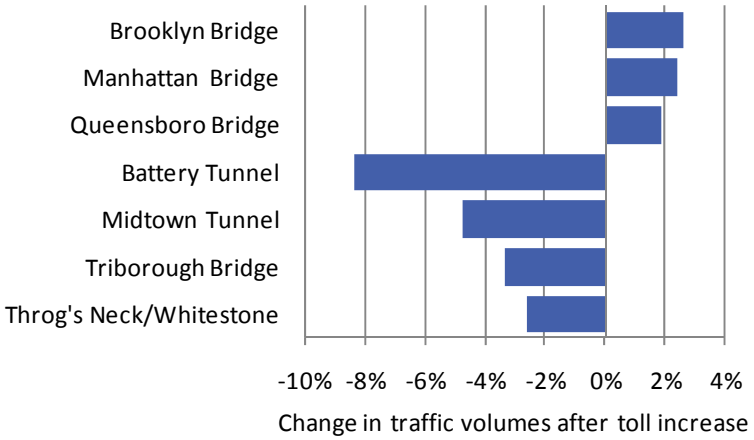
Equity considerations are often raised as an objection to pricing. However, charging drivers fees and using the money to improve public transportation would actually increase equity between users of the transportation system.

Tolls and fees on drivers are proven ways to reduce traffic.

Higher tolls reduce the number of people using tunnels and bridges.

- After a 1996 toll increase, traffic volumes declined by 2.6% to 8.3% at tolled crossings. (See Figure 22.) [Schaller Consulting 2003]
- Variable tolls on the Hudson River crossings (a $1 peak to off-peak differential for E-ZPass users) produced a 7% shift away from A.M. peak hours at the Holland and Lincoln Tunnels. [Holguín-Veras 2005]

Figure 22. Traffic impacts from March 1996 MTA toll increase



Source: Schaller Consulting 2003

Parking cost and availability critically affect the choice between auto and transit.

- The lack of parking is the most frequent reason that New York City residents take the subway instead of driving when both modes are under consideration for a trip. [Schaller 2001]
- Government workers, many of whom have free parking, are twice as likely to drive to work in the Manhattan CBD as private sector workers (27% compared with 14%). [2000 Census data]

Pricing measures are anticipated to sharply reduce traffic volumes.

- A congestion pricing program that produced a 15% reduction in overall traffic volumes (equivalent to the reduction in traffic volumes in London) would reduce by 27% the vehicle hours traveled in the Manhattan CBD and achieve similar reductions in vehicle hours traveled in Downtown Brooklyn, Greenpoint/Williamsburg and Long Island City. (Reductions in vehicle hours traveled are produced by a combination of fewer vehicles and higher speeds.) [PFNYC 2006]
- East River bridge tolls would reduce traffic volumes on the bridges by an estimated 25%. [Schaller Consulting 2003]
- East River bridge tolls would reduce traffic on streets leading into Downtown Brooklyn by 12%, and streets leading into Long Island City by 14%.

The pricing of East River crossings encourages motorists to divert into residential neighborhoods.

The presence of tunnel tolls have heightened traffic volumes on free East River bridges.

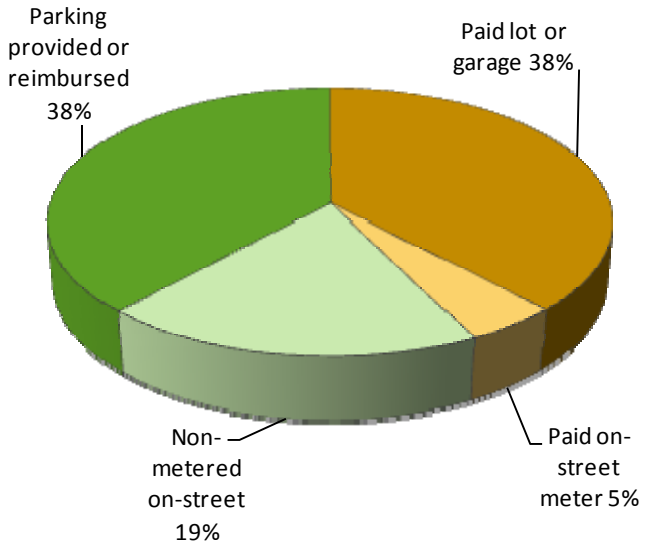
- 35% of Manhattan-bound drivers on the Gowanus Expressway in Brooklyn bypassed the Brooklyn Battery Tunnel and instead used the Brooklyn Bridge, or in some cases the Manhattan or Williamsburg Bridges, during the morning peak period. [Schaller Consulting 2003]
- Diverting drivers comprised one-third of Brooklyn Bridge traffic during the morning peak.
- After the 1996 toll increase, the largest decline in traffic was at the Battery Tunnel while the nearby Brooklyn Bridge showed the largest traffic increase among the East River bridges. (See Figure 22.)

Parking costs do not affect most motorists who drive into the Manhattan CBD.

Most motorists pay little or nothing to park in the Manhattan CBD.

- Only 38% of motorists who park in the Manhattan CBD pay to park in a garage or lot. (See Figure 23.) [Schaller Consulting 2007b]
- Most of those not paying had parking provided to them or were reimbursed the cost. Others parked on the street, primarily at unmetered spaces.

Figure 23. Payment for parking by motorists parking in the CBD, 2007



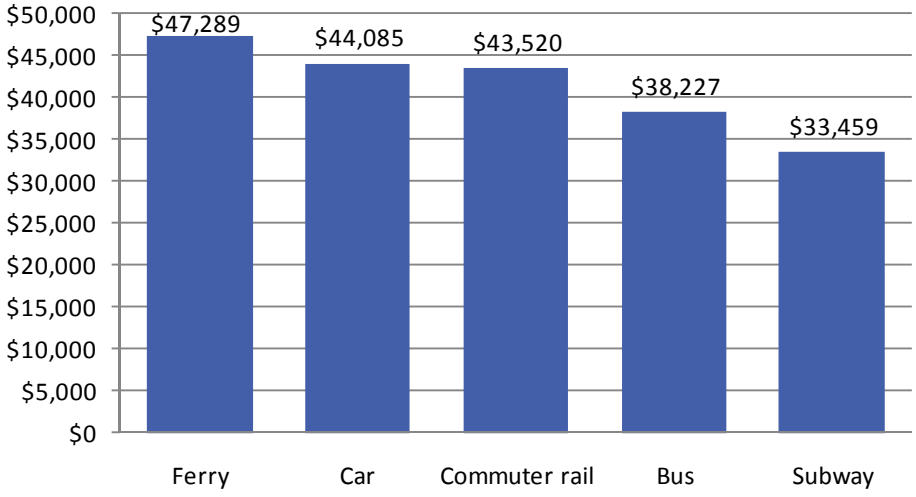
Source: Schaller Consulting 2007b

Using fees on drivers to improve public transportation would improve equity in the transportation system

Auto commuters have higher incomes than transit riders.

- Among Bronx, Brooklyn, Queens and Staten Island residents who work in Manhattan, auto commuters earn 32% more than subway commuters and 15% more than bus commuters. (See Figure 24.) [2000 Census data]
- Auto commuters living in Manhattan earn 20% more than bus commuters and 18% more than subway commuters.
- Similar earnings gaps are seen among residents of outlying areas of the outerboroughs. Among commuters from outlying parts of the city that lack direct subway access, auto commuters earn 35% more than do subway commuters.

Figure 24. Earnings of Bronx, Brooklyn, Queens and Staten Island residents who work in Manhattan, 1999



Source: 2000 Census data

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Schaller Consulting 2007a	Schaller Consulting, "Traffic Information in NYC: What We Know, What We Need to Know," report prepared for Transportation Alternatives, January 2007. www.transalt.org/campaigns/reclaiming/traffic_info_needs_2007.pdf

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Shoup 2005	Donald C. Shoup, *The High Cost of Free Parking*, American Planning Association, 2005.
Transp. Alternatives 2006	Transportation Alternatives, "Traffic's Human Toll," October 2006. www.transalt.org/campaigns/reclaiming/trafficshumantoll.pdf
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Tri-State 2006	Tri-State Transportation Campaign, "Mobilizing the Region #537," August 18, 2006. www.tstc.org/bulletin/archives/mtr537.html

Databases used for analysis

The author expresses his appreciation to NYMTC and NYCDOT staff who have provided data files and technical assistance.

2000 Census data	2000 U.S. Census of Population and Housing. Most of the Census data used in this report are based on Census Transportation Planning Package (CTPP) tables, which provide detailed home and workplace commuting data at the census tract level. CTPP tables are based on a 1 in 6 sample of households, thus providing a very large sample of New York City residents. Earnings data are not provided in the CTPP; earnings are derived from Public Use Microdata Sample (PUMS) files, which are based on a 5% sample of Census returns. Because PUMS shows workplace at the borough level in New York City, data in this report for earnings of CBD workers cover all Manhattan workers rather than CBD workers.
NYCDOT CBD cordon data	Annual fall vehicular counts at bridges and tunnels leading into the Manhattan Central Business District and at the 60 Street cordon (river to river). Excel file provided by NYC Department of Transportation. Data are through the fall of 2005.
NYMTC HIS data	Household travel survey conducted for the New York Metropolitan Transportation Council and North Jersey Transportation Planning Authority in 1997-98. The survey covered 27,369 individuals in 11,264 households in the 28 county New York metro area and was designed to produce reliable measurements of weekday travel at the county level. Sample size is more than sufficient for reliable estimates of weekday travel to the Manhattan CBD as well.
NYMTC BP model data	Best Practice travel model created for the New York Metropolitan Transportation Council. NYMTC provided several data files that are used in this report: • Home-based journeys involve a destination and possibly other stops and the return to home. Figure 12 shows journeys with New York City destinations (regardless of home base), thus including commuters entering NYC but excluding a small number of journeys by city residents leaving the city. Table 1 shows journeys by NYC residents based on home borough; these exclude journeys by suburban commuters. Data are for the 2002 baseline year. • Vehicle miles traveled (VMT) -- model output showing VMT for various modes in Figures 4 and 5. Data are for the 2002 baseline year. The BP data are the most comprehensive source for trip-making and VMT in the New York region. The model continues to undergo development and refinement, however, and is known to need improvement in certain areas. Most notably for the data presented in this report, truck and commercial vehicle trips and VMT are known to be under-estimated (see Lawton 2005). Review of the data also indicate that citywide taxi/for-hire trips with passengers are over-estimated. The model does not model VMT without passengers, however. As a result, total taxi/for-hire VMT appears to be under-estimated.

Appendix Tables

Means of transportation to work, New York City residents, 2000

Number of workers by place of residence

	NYC	Bronx	Brooklyn	Manhattan	Queens	Staten Island
Auto	1,050,898	148,887	277,818	83,850	410,911	129,432
Bus	367,260	65,729	93,858	78,662	92,770	36,241
Subway	1,203,377	144,786	402,524	333,103	318,381	4,583
Commuter railroad	49,569	8,296	11,978	7,428	20,280	1,587
Ferry	11,787	179	463	456	163	10,526
Taxicab	53,613	5,564	6,219	34,949	6,327	554
Motorcycle	1,222	54	357	370	354	87
Bicycle	14,964	1,132	4,482	6,809	2,072	469
Walked	331,221	31,217	78,858	162,614	53,068	5,464
Other method	16,793	2,481	3,854	5,624	4,049	785
Total commuters	3,100,704	408,325	880,411	713,865	908,375	189,728
Worked at home	93,954	8,448	21,103	44,172	17,390	2,841
Total workers	3,194,658	416,773	901,514	758,037	925,765	192,569

Mode shares

	NYC	Bronx	Brooklyn	Manhattan	Queens	Staten Island
Auto	33.9%	36.5%	31.6%	11.7%	45.2%	68.2%
Bus	11.8%	16.1%	10.7%	11.0%	10.2%	19.1%
Subway	38.8%	35.5%	45.7%	46.7%	35.0%	2.4%
Commuter railroad	1.6%	2.0%	1.4%	1.0%	2.2%	0.8%
Ferry	0.4%	0.0%	0.1%	0.1%	0.0%	5.5%
Taxicab	1.7%	1.4%	0.7%	4.9%	0.7%	0.3%
Motorcycle	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Bicycle	0.5%	0.3%	0.5%	1.0%	0.2%	0.2%
Walked	10.7%	7.6%	9.0%	22.8%	5.8%	2.9%
Other method	0.5%	0.6%	0.4%	0.8%	0.4%	0.4%
Total commuters	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Travel time to work

	NYC	Bronx	Brooklyn	Manhattan	Queens	Staten Island
Auto	34	32	35	37	34	35
Bus	48	50	47	36	52	68
Subway	49	57	53	35	55	86
Commuter railroad	63	59	67	67	60	63
Ferry	73	89	60	47	57	74
Taxicab	21	25	26	19	26	19
Motorcycle	25	34	23	20	25	46
Bicycle	23	20	27	20	26	30
Walked	16	17	16	16	16	18
Other method	38	30	40	39	36	60

Commuting to the Manhattan Central Business District, 2000

CBD Commuters

	Live in New York City	Live in Suburbs	Total	Pct. live in New York City
Total	1,213,575	478,380	1,691,955	72%
Auto	141,433	125,753	267,186	53%
Bus	120,676	85,808	206,484	58%
Subway, rail, ferry	798,125	262,994	1,061,119	75%
Walk, taxi, bike	153,337	3,825	157,162	98%

Mode shares

Auto	12%	26%	16%
Bus	10%	18%	12%
Subway, rail, ferry	66%	55%	63%
Walk, taxi, bike	13%	1%	9%
Total	100%	100%	100%

Travel time to work

Auto	45	65	54
Bus	53	70	60
Subway, rail, ferry	47	74	54
Walk, taxi, bike	19		20
All modes	44	70	51

Excludes workers who work at home or outside the 40-county New York region.

Commuting to the Manhattan Central Business District, New York City residents, 2000

	Borough of residence					
	Bronx	Brooklyn	Manhattan	Queens	Staten Island	NYC total
Auto	17,494	33,400	23,945	51,309	15,285	141,433
Bus	13,950	17,925	42,528	24,421	21,852	120,676
Subway, rail, ferry	82,798	241,207	247,928	214,287	11,905	798,125
Walk, taxi, bike	1,598	4,896	142,807	3,547	489	153,337
Total work in CBD	115,840	297,428	457,212	293,564	49,531	1,213,575
Mode shares						
Auto	15%	11%	5%	17%	31%	12%
Bus	12%	6%	9%	8%	44%	10%
Subway, rail, ferry	71%	81%	54%	73%	24%	66%
Walk, taxi, bike	1%	2%	31%	1%	1%	13%
Total	100%	100%	100%	100%	100%	100%
Travel time to work						
Auto	46	44	31	48	59	45
Bus	58	55	34	60	74	53
Subway, rail, ferry	58	51	33	54	76	47
Walk, taxi, bike	39	35	18	37	65	19
All modes	56	50	28	53	70	44

New York City residents' mode to work, 2000

	New York City residents who work in:				
	Same borough	Different borough	Suburbs	Outside metro area	Total
Total commuters	1,593,458	1,236,586	252,734	17,124	3,099,902
Mode shares					
Auto	33%	27%	71%	47%	34%
Bus	14%	10%	8%	7%	12%
Subway, commuter rail, ferry	29%	61%	17%	14%	41%
Walk, taxi, bicycle	24%	2%	4%	32%	14%
Total	100%	100%	100%	100%	100%
Travel time to work					
All modes	29	52	49	49	40
Auto	25	43	44	47	34
Bus	40	61	64	65	49
Subway, commuter rail, ferry	39	55	69	59	50
Walk, taxi, bicycle	17	31	32	44	18

Excludes workers who work at home.

Commutes to work within or between the Bronx, Brooklyn, Queens and Staten Island

Workers commuting within home borough

	Borough of both residence and work				
	Bronx	Brooklyn	Queens	Staten Island	Total
Total commuters	161,145	410,893	351,151	82,992	1,006,181
Mode shares					
Auto	43%	40%	56%	78%	49%
Bus	22%	16%	14%	12%	16%
Subway, commuter rail	14%	25%	15%	2%	18%
Walk, taxi, bicycle	21%	20%	15%	8%	17%
Total	100%	100%	100%	100%	100%
Travel time to work					
Auto	23	27	25	20	25
Bus	43	43	44	45	43
Subway, rail	48	48	47	53	48
Walk, taxi, bike	16	17	16	16	16
All modes	30	33	29	24	30

Excludes workers who work at home.

Workers commuting between the Bronx, Brooklyn, Queens and Staten Island

Excludes those commuting to Manhattan, the suburbs or their home borough (e.g., Bronx to Bronx),

	Borough of residence				
	Bronx	Brooklyn	Queens	Staten Island	Total
Total commuters	36,955	82,952	110,971	36,148	267,026
Mode shares					
Auto	38%	51%	60%	85%	58%
Bus	10%	8%	7%	8%	8%
Subway, commuter rail	48%	37%	30%	5%	31%
Walk, taxi, bicycle	3%	4%	3%	1%	3%
Total	100%	100%	100%	100%	100%
Travel time to work					
Auto	44	41	38	46	41
Bus	59	61	58	73	61
Subway, rail	70	67	62	85	66
Walk, taxi, bike	39	32	25	38	31
All modes	58	52	46	50	50

Source for all tables in appendix: 2000 Census. Table on page 34 is based on Public Use Microdata (PUMs) which is comprised of 5% of the total population, and contains the highest level of modal detail. Tables on pages 35-38 are based on Census Transportation Planning Package (CTPP) files, which are based on the 1 in 6 sample that completed the "long form" which includes journey to work questions. Due to sampling, PUMs results differ slightly from CTPP results.