DESIGN TRUST
FOR PUBLIC SPACE

TLC NEW YORK CITY TAXI & LIMOUSINE COMMISSION

TAXI

ROAD

FORW

TAXI 07: ROADS FORWARD IS A PROJECT OF THE DESIGN TRUST FOR PUBLIC SPACE AND THE NEW YORK CITY TAXI & LIMOUSINE COMMISSION.

Design Trust for Public Space
http://www.designtrust.org/

New York City Taxi & Limousine Commission
http://www.nyc.gov/tlc

Design Trust Executive Director
Deborah Marton

Design Trust Staff
Megan Canning, Director of Operations
Stephanie Elson, Director of Programs

Design Trust Project Fellows
Rachel Abrams
Sylvia Harris
Adam Millard-Ball
Eric Rothman
Anisha Sawhney
Rachel Weinberger

Editors
Rachel Abrams
Stephanie Elson
Chelsea Mauldin

Art
Jason Little, cartoons
Stewart Simons, photography

Design
mgmt. design

Project Director
Chelsea Mauldin

ISBN 978-0-9777175-1-4

TAXI 07
ROADS FORWARD

DECEMBER 2007
NEW YORK CITY

DESIGN TRUST
FOR PUBLIC SPACE

TLC NEW YORK CITY TAXI & LIMOUSINE COMMISSION

CONTENTS

PREFACE
DESIGN TRUST FOR PUBLIC SPACE

In honor of the hundredth anniversary of the first gas-powered taxi in New York City, the Design Trust for Public Space launched Taxi 07, a program to facilitate innovative new cab designs and propose improvements to the technologies, regulations, and public spaces that support the taxi system. This publication is one of the products of that project.

The Design Trust for Public Space is a not-for-profit organization committed to improving the design, utility, and understanding of New York City's public spaces. We forge public/private partnerships between neighborhoods, city agencies and design professionals. While the subject of Design Trust projects may vary, the goal is always to make New York City more beautiful, sustainable, functional, and available to all.

To ensure that Design Trust projects become reality on city streets, we will not initiate a project without the collaboration of the city agency or community group best situated to implement the project's results. In the case of Taxi 07, and *Taxi 07: Roads Forward* in particular, the Design Trust enjoyed an enormously productive partnership with the New York City Taxi & Limousine Commission (TLC). Together, the Design Trust and the TLC selected six extraordinary fellows who are the primary authors of this document.

The project also benefited from an unprecedented level of citywide and taxi industry-wide collaboration. A broad range of taxi stakeholders—drivers and fleet-owner groups, environmental and accessibility organizations, and New York City agencies—were either interviewed by our fellows or asked to review *Taxi 07: Roads Forward* in draft form. Comments from these experts have been incorporated here to the fullest extent possible. For a full list of interview participants and peer reviewers, please see the Acknowledgments section.

The broad collaboration that produced this book attests to strong optimism about the future of New York City public spaces and for our city's taxis in particular. In fact, taxis will contribute to improving New York City's air quality by meeting new fuel-efficiency and emissions goals currently under review by the TLC. These goals, originally proposed in PlaNYC, Mayor Michael R. Bloomberg's blueprint for New York City's environmental future (released April, 2007), include plans for replacing the New York City taxi fleet with hybrid-electric vehicles over time. Finally, we wish to thank Paul Herzan, whose passionate civic commitment inspired and guided this project. We believe that discussion, study, and implementation of the findings and strategies described here will help make New York's cabs more usable, more economically valuable, more efficient, and more sustainable for all New Yorkers—now and for generations to come.

Deborah Marton
Executive Director
Design Trust for Public Space
December 2007

PREFACE
TAXI & LIMOUSINE COMMISSION

As we celebrate the 100th Anniversary of the New York City taxicab, it is natural for the Taxi & Limousine Commission (TLC) to reflect not only on the accomplishments of the past—but on our plans and outlook for the future. We are undoubtedly in a good place—as the taxicab industry has reached unforeseen heights of safety, customer service, economic health and opportunity. However, we can always strive to do better to fulfill our agency's mission—and that is why we participated in Taxi 07.

Taxi 07 and our work with the Design Trust was a collaborative starting point to take a fresh look at redefining the taxi—from both a functional and aesthetic standpoint—to complement our beautifully transformed metropolis. When I was first appointed Commissioner, I never envisioned that we would be collaborating with architects, designers and graphic artists to help fulfill our vision. This project has certainly served as an inspiration to many ongoing and new efforts to improve service.

Roads Forward is a comprehensive and interesting perspective on where the taxi industry has come from and where it should go. While we all agree to move forward—there are, of course, many different roads we can travel to get to our final destination. The importance of this project is to recognize that progress is a "two-way street"—involving the "give and take" of all identifiable stakeholders. While traffic moves in an orderly fashion on our road of progress, we endeavor to travel at the speed limit rather than below it. That is why we no longer refer to our project as the "Taxicab of the Future"—but rather as the "Taxicab of Tomorrow."

The "Taxicab of Tomorrow" project is the Bloomberg Administration's plan to identify and develop a functional and aesthetically appropriate taxicab that is accessible, clean-air fueled, durable and user-friendly. Today, we are seeing the first of our new taxicab logos and designs hit the streets, and soon every taxicab will have a new sleek and uniform look—to complement our dynamic city. On the sustainability front, thanks to Mayor Bloomberg's PlaNYC, by 2012 every taxicab will be clean air fueled to improve our environment and reduce the city's carbon footprint. To date, the TLC has more hybrid-electric taxicabs on the road than any other U.S. city, and we will be speeding-up our progress. Our next steps are to identify and develop the characteristics and specifications of the ideal vehicle to be branded as New York City's iconic taxicab. Details such as the rooflights, partitions, height and shape, legroom and headroom of the taxicab will be identified and we will work with automobile manufacturers to make this dream a reality as soon as possible.

The TLC has also initiated and implemented many projects designed to enhance the quality and availability of taxicab customer service. For instance, the TLC auctioned additional medallions—including many dedicated to vehicles that are clean air fueled and accessible to passengers with disabilities. Also, the TLC developed new taxicab technology providing for credit card payment options and interactive backseat passenger information screens that include fare rates, news, entertainment and maps by just touching the screen. The rear seat taxicab experience will be dramatically transformed, with new clear and smaller partitions and no more messy interior stickers. Our new location-based technology system will provide text messaging for drivers to find places and events where passengers are waiting for taxi service, and to help recover lost passenger property more quickly and successfully.

I would like to thank the team of fellows at the Design Trust for Public Space, all of the members of Taxi 07 and our dedicated staff at the TLC for their hard work and creativity. While the TLC may not agree with every concept, idea or suggestion in *Roads Forward*, this publication represents a giant leap on our road of progress – and we are delighted that our agency can make a significant contribution not only to our passengers, but to the greatest public space in our universe.

Matthew W. Daus
Commissioner/Chairman
New York City Taxi & Limousine Commission
December 2007

PART I:
GUIDING PRINCIPL

ES

THE CONTEXT OF TAXI 07: ROADS FORWARD

As a joint project of the Design Trust for Public Space and the New York City Taxi & Limousine Commission (TLC), *Taxi 07: Roads Forward* reflects the particular interests of those organizations. Specifically, this publication asks, how can the taxi best function as a vital part of New York's public realm? And how can the taxi system be optimally regulated to provide an excellent transportation service for all of its passengers and stakeholders—and for the city at large?

The Taxi as an Icon—and a Public Space

Hailing a cab, with its promise of freedom, power, and anonymity, is the quintessential New York City act. Stick an arm in the air, and a taxi will take you where you want to go at any time of day or night. With each journey, driver and passenger enter a brief, strangely intimate, and occasionally profound relationship in which New York's diverse communities—economic, social, racial—collide. It's no surprise that the yellow cab has become a globally recognized symbol of the city.

That symbol also represents both sweat and dreams: Countless immigrants have gotten behind the wheel of a yellow cab in search of a better life. Although the work can be tiring, frustrating, and occasionally dangerous, it provides flexibility and autonomy. Drivers can set their hours to meet personal, financial, educational, or family goals. It also provides a crash course in all things New York—no other job transforms newcomers into streetwise New Yorkers faster. Eventually, some drivers are able to finance the purchase of their own medallion. In fact, the largest fleets in operation were founded generations ago by drivers. It is still true today that hard work can lead to the better life that inspires many drivers to leave their native countries. Taxis have become a potent icon of that American dream.

Taxis are also a dominant feature of New York City's visual landscape, a crucial transit link, and a major contributor to the city's environmental quality. Although the yellow car is the icon, taxis collectively comprise a social, political, and economic system. The taxi system includes passengers, drivers, fleet owners, garages that service and own taxis, and regulatory agencies like the New York City Taxi & Limousine Commission. The system also includes the streets and sidewalks that taxis and passengers rely on and that every New Yorker maintains with tax dollars.

This civic investment in taxi infrastructure, buttressed by laws that oblige taxis to service anyone who hails them, point to an important fact: taxis are an extension of New York City's public space. Just as Fifth Avenue or Grand Central Terminal have a distinct public identity, enjoyed by anyone who has ever strolled past the Plaza Hotel or stood under the starry ceiling of the main hall, so too does the taxi. Like all great public spaces, New York cabs both serve the city and stand as an important part of its identity.

The Taxi as a Regulated Public Service

What does it mean for the New York City Taxi & Limousine Commission to be a regulator of this vital service? There are three main stakeholders that the TLC has to balance: passengers, drivers, and owners. The complexity of regulating this industry lies in the TLC's balancing act to keep the industry healthy and serve the best interest of the City of New York. This means that owners need to see a return on their investments, drivers need to make a livable wage, and passengers need to receive appropriate service that is safe and comfortable.

To maintain equilibrium in service, the TLC must maintain a healthy relationship between supply and demand. The TLC must do this for all of the for-hire transportation industries it regulates, including yellow taxis, livery vehicles, black cars, limousines, commuter vans, and ambulettes. 1 This document focuses mainly on the yellow-taxi system, with some limited discussion of the livery vehicles and black cars. However, many of the lessons learned can be applied to all for-hire industries.

1 All references to the various industries will be explicit. Any references to "taxi" or "taxi system" in New York City will be to the yellow taxi system. In most cities (London is an exception), there is no distinction between "taxis" and what NYC calls "livery vehicles." In such cities, taxis are the dominant term of usage and "liveries" generally refers to unregulated or even illegal for-hire vehicles.

UNDERSTANDING TAXI 07: ROADS FORWARD

Taxi 07: Roads Forward is a selective guide to the current New York City taxi system, as well as an exploration of ways the system might be improved for all New Yorkers. The primary authors of this publication are six Design Trust fellows, an outstanding interdisciplinary team that includes urban planners, information designers, economists, and transportation experts: Rachel Abrams, Sylvia Harris, Adam Millard-Ball, Eric Rothman, Anisha Sawhney, and Rachel Weinberger.

It is important to note that the authors solicited significant input from TLC staff, as well as a wide range of taxi-industry stakeholders. That said, the recommendations included in this document should be understood as suggestions from an outside counsel. Further, most suggestions are stated as actions that the TLC 'could' take to achieve stated goals, rather than actions that they 'should' or 'must' take. It is not intended that every benchmark or strategy in this document will necessarily be implemented—rather, by drawing on this body of research, the TLC will have a range of resources for future policy and regulatory decisions.

How This Book Is Structured

This section, "Guiding Principles," outlines the fundamental context and goals that prompted this book. It also outlines a set of guiding principles for New York City's taxi services.

The second part of this publication, "An Illustrated Guide to the Taxi System," then explores the current functioning of the taxi system—who's involved, where, when and how taxis are used, what vehicles provide taxi services, and much more.

The final part, "Strategies for Improving the Taxi System," continues the discussion around four topics: usability, economic value, efficiency, and sustainability. Each topic offers an assessment of the current system and a selection of potential benchmarks and useful strategies that the TLC might choose to explore as soon as this year, or as far out as a decade from now.

A Broad Interest in the System and the City

All sections of *Taxi 07: Roads Forward* accept a fundamental premise: that New York's taxi services form a system—a network of interactions between people, vehicles, and the city itself. The focus of this publication is on understanding those interactions and then considering what feasible, incremental changes might improve taxi services to the benefit of the entire system. *Taxi 07: Roads Forward* considers the system from a broad range of perspectives. The authors represent a range of professional disciplines, and they approached New York's taxi services through multiple lenses—public-space design, transportation policy, business planning, materials science, and so on.

In addition to these various viewpoints, *Taxi 07: Roads Forward* is also mindful of the City of New York's commitment to a strategic vision for the city's future. This vision

was recently articulated in PlaNYC, Mayor Michael R. Bloomberg's blueprint for New York City's environmental future (released April 2007). Issues of population growth, urban infrastructure, and environmental quality will affect the supply of and demand for taxi services. The assessments and strategies contained in the third part of this book were developed with these citywide concerns in mind.

A Narrow Focus on What's Feasible

Taxi 07: Roads Forward strives to provide direction that is achievable. The danger of any optimistic, broad-ranging investigation is that it generates plans that are out of sync with everyday realities and constraints. Naturally, some of the policy goals are more complicated and difficult to implement than others, but overall, they are rooted in the realities of taxi service in New York City. It is important to note that although the taxi system might benefit from actions by other City, State, or Federal agencies—as well as private-sector entities—this book is focused on the efforts of the New York City Taxi & Limousine Commission. Traffic management, public-realm enhancements, vehicle-design considerations, and other topics are only addressed if the TLC has a current or potential role to play in bringing about improvements.

FOUR GUIDING PRINCIPLES FOR NEW YORK CITY'S TAXI SYSTEM

What emerges from this wide-ranging exploration of the taxi system—and from a subsequent targeting of focus—are four guiding principles. The Design Trust for Public Space and the TLC have collaborated to develop these principles as a foundation for the TLC's future goals.

New York City's taxi system should offer taxi services that are safe, comfortable, and easy to use for all passengers and drivers.

New York City's taxi system should provide a good economic value to passengers and service providers.

New York City's taxi system should efficiently match the supply of taxi services with passenger demand.

New York City's taxi system should contribute to the environmental sustainability of the city.

These principles are inherent in the measurements and strategies outlined throughout this publication. By supporting these principles, the Design Trust continues its efforts to support excellence in public-space design and planning, while the TLC signals its ongoing commitment to furthering the development and improvement of taxi service in New York City and establishing an overall public-transportation policy.

FOUR GUIDING PRINCIPLES FOR NEW YORK CITY'S TAXI SYSTEM

NEW YORK CITY'S TAXI SYSTEM SHOULD OFFER TAXI SERVICES THAT ARE SAFE, COMFORTABLE, AND EASY TO USE FOR ALL PASSENGERS AND DRIVERS.

NEW YORK CITY'S TAXI SYSTEM SHOULD PROVIDE A GOOD ECONOMIC VALUE TO PASSENGERS AND SERVICE PROVIDERS.

NEW YORK CITY'S TAXI SYSTEM SHOULD EFFICIENTLY MATCH THE SUPPLY OF TAXI SERVICES WITH PASSENGER DEMAND.

NEW YORK CITY'S TAXI SYSTEM SHOULD CONTRIBUTE TO THE ENVIRONMENTAL SUSTAINABILITY OF THE CITY.

PART II:

AN ILLUS GUIDE TO THE TAXI

TRATED

SYSTEM

INTRODUCTION

Taking a yellow cab seems like a fairly uncomplicated experience: you hail, a taxi stops, you ride to your destination, pay the driver, and get out. Simple. But that cab trip may actually be one of the most highly organized experiences in a New Yorker's day. A century of social custom and government rule-making control most aspects of the ride, and dozens of behind-the-scenes actors are deeply involved in every detail of the vehicle and its service.

The illustrated guide that follows explores various aspects of the taxi system, with a focus on explaining yellow-cab service now, in 2007, the centennial of the modern taxi. Special attention is paid to the cab vehicle itself; to the demographics, motivations, and experiences of taxi passengers; to taxi drivers and the various ways in which they participate in the taxi system; to medallion owners and other industry stakeholders that support the taxi system; and to the New York City Taxi & Limousine Commission, which knits all these actors together through its role as the regulator of city taxi services.

Understanding the current taxi system as an interconnected network of users, service providers, regulators, and others is crucial for understanding the scope of the taxi universe. In fact, New York's yellow cabs are just the most visible part of a sprawling industry. More than 35,000 people serve the taxicab industry, either directly—as drivers, owners, brokers, or mechanics—or through support businesses such as insurance companies and credit unions. Yellow medallion taxis also generate more than $1.5 billion in annual revenues—for private owners and for the region's tax coffers (Urbitran, 2004, p.18).

Taxis also serve a vital purpose in New York City's transport system, meeting an intense demand for mobility in the city center and reaching out to serve far-flung neighborhoods distant from other transit services. In addition to yellow cabs, which can be hailed fairly easily in most parts of Manhattan and with increasing ease in parts of Brooklyn and Queens, most parts of the metropolis are well-served by a complex for-hire vehicle system that includes car and limousine services.

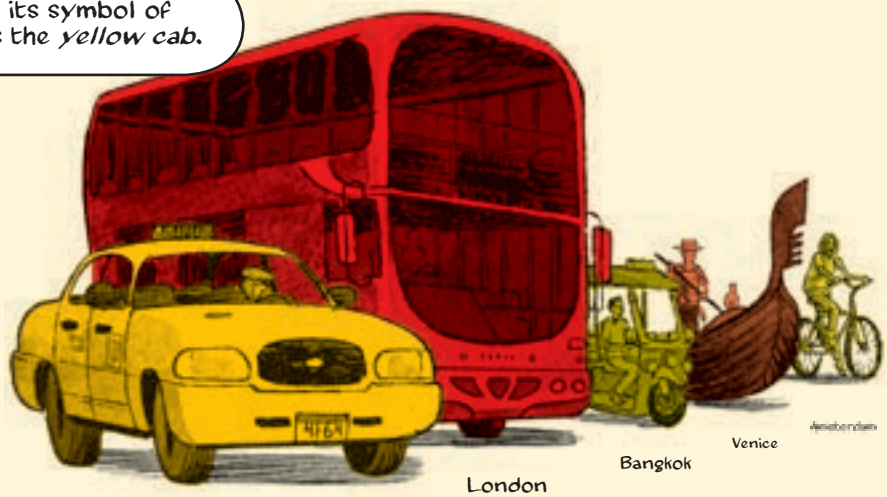
These services complement New York's extensive public-transportation system. Together, taxi services and mass transit make it possible to enjoy a lifestyle unthinkable in most American cities: residents and visitors can access the myriad activities offered by the city without a private automobile, contributing to New York's position as one of the world's most environmentally efficient major cities.

This systemic understanding lays the groundwork for measuring and monitoring various aspects of taxi service, and it supports a range of strategies for improving the taxi system—topics that will be addressed in the third part of this book, "Strategies for Improving the Taxi System."

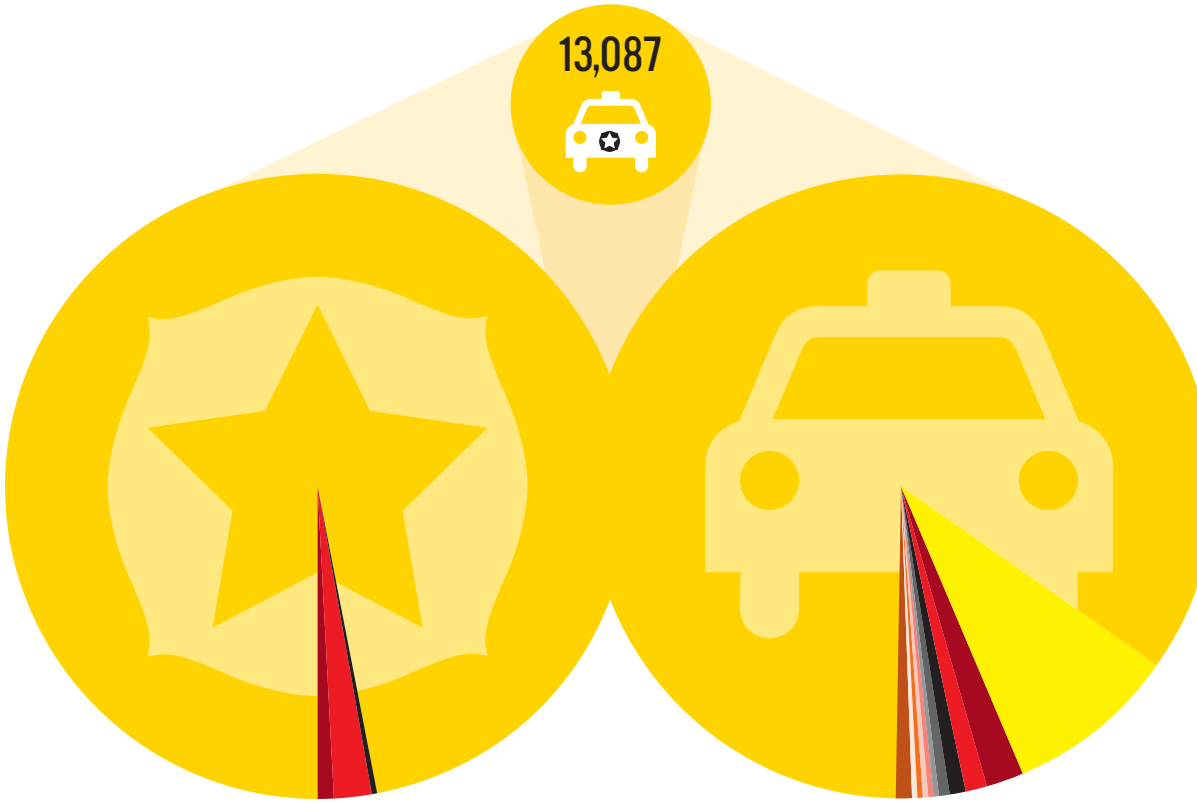
THE TAXICAB

FEW URBAN ICONS ARE AS RECOGNIZABLE AS THE NEW YORK MEDALLION TAXICAB. DESPITE ITS SINGULAR FAME, HOWEVER, THE CITY'S FLEET OF OVER 13,000 YELLOW CABS IS MADE UP OF DOZENS OF VEHICLE TYPES. WHATEVER THE MAKE AND MODEL, ANY NEW YORK CAB MUST BE SAFE, ROBUST, AND COMFORTABLE; AFFORDABLE TO BUY AND MAINTAIN; AND EFFICIENT TO RUN. INCREASINGLY, THE FLEET IS ALSO INCORPORATING CLEAN-FUEL AND ACCESSIBLE VEHICLES, SUGGESTING THAT THE TAXI OF THE FUTURE WILL BE MORE SUSTAINABLE AND MORE USABLE FOR ALL.

INTRODUCING THE NEW YORK CITY TAXICAB



THE MEDALLION TAXI FLEET



FLEET BY MEDALLION TYPE

- 12,717 standard medallions
- 35 'converts' (standard medallions used on hybrid vehicles)
- 254 alternative-fuel medallions
- 81 wheelchair-accessible medallions

FLEET BY VEHICLE TYPE

- 11,324 Ford Crown Victoria sedans
- 1,318 Toyota Sienna minivans
- 5 Honda Odyssey minivans
- 56 models with 3 or fewer vehicles

HYBRID OR ALTERNATIVE FUEL

- 216 Ford Escape SUVs
- 61 Toyota Highlander SUVs
- 16 Compressed Natural Gas (CNG) Ford Crown Victoria sedans
- 6 Toyota Prius sedans
- 4 Toyota Camry sedans

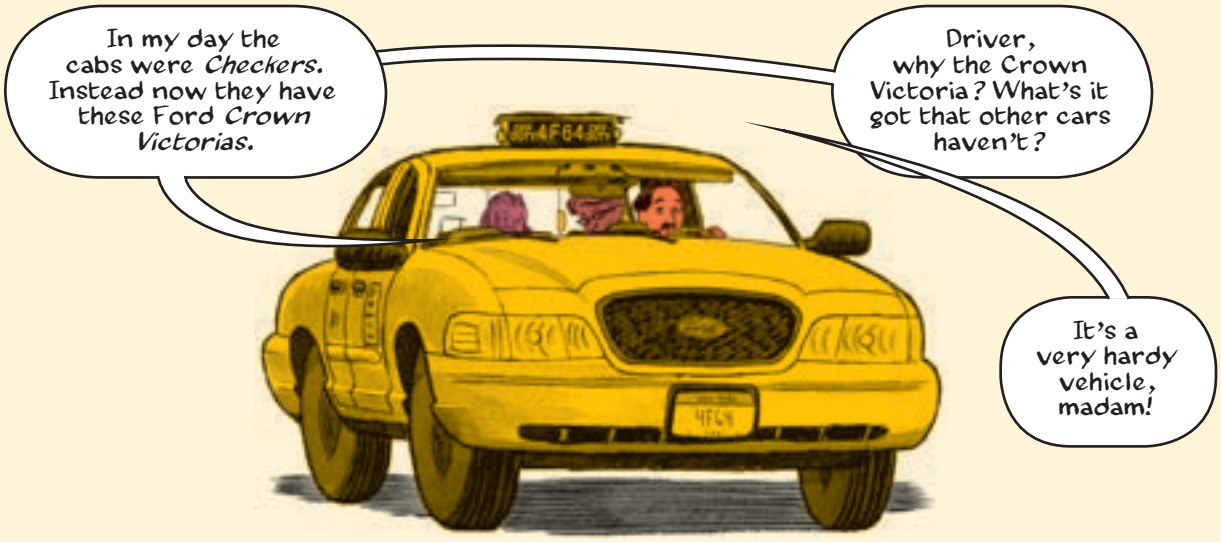
WHEELCHAIR ACCESSIBLE

- 52 Chevy Uplander SUVs
- 27 Ford Freestar minivans
- 2 Dodge Grand Caravan SUVs

HOW MANY DIFFERENT KINDS OF YELLOW CABS ARE THERE?

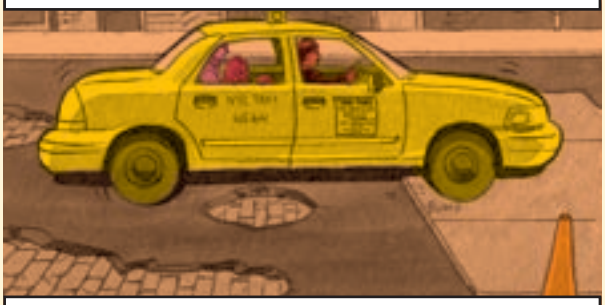
New York's yellow cabs are part of a 13,087-strong fleet of TLC-licensed medallion taxis, shown here by type of vehicle and by type of medallion. (All figures are approximate, as of April 2007.) Although Ford Crown Victorias still make up the majority of medallion cabs, the fleet is growing greener and more accessible. In early 2006 Mayor Bloomberg and City Council Speaker Christine Quinn backed the passage of Local Law 54, authorizing the release of taxi medallions intended for use on wheelchair-accessible and clean-air vehicles. That summer, the TLC conducted a round of auctions, resulting in over 250 such taxicabs being placed into service by the end of the year. In November 2007, as this document goes to print, a medallion sale will bring the total number of medallions up to 13,151, and the number of wheelchair-accessible medallions to 144.

YELLOW-CAB REQUIREMENTS



A cab must be equally reliable during a 5° winter cold snap, or in the midst of a 104° heat wave.

The frame and suspension of a cab must tolerate the streets' landscape of potholes, cobblestones, and metal sheeting.

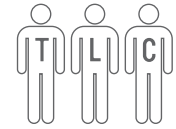
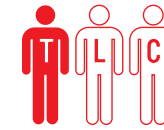
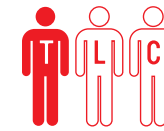


And the engine must be strong enough to drive around the clock. With continuous driving some cabs rack up as many as 100,000 miles a year.

Some would argue that its V8 engine and 13 miles-per-gallon fuel consumption provide too much muscle and not enough efficiency!


And some passengers complain that there's not enough leg room in the back seat.
I can believe that, yes.
So now we have more options. We may choose also from the Ford Escape, plus a few Toyotas—the Sienna, Highlander, Prius, and Camry—and other models.
There are other kinds of cabs too, but they're not all *yellow*. Say you're out in Brooklyn. You can stick your arm out as long as you want, but you might not see a cab. So you have to call a *car service*.
Car service, or "livery" vehicles, will come to you with a phone call, dispatched to you by radio. They can be any make and model. Trips tend to start or end in the neighborhood where the dispatch base is.
And then there are the *black cars*. These are Lincoln Town Cars on retainer to corporate accounts. They tend to drive executives to and from home, and to meetings.
And, back in the mid '80s, as radios were removed from yellow cabs, black car companies emerged to consolidate these radio licenses, and cater to customers who expected to call ahead.

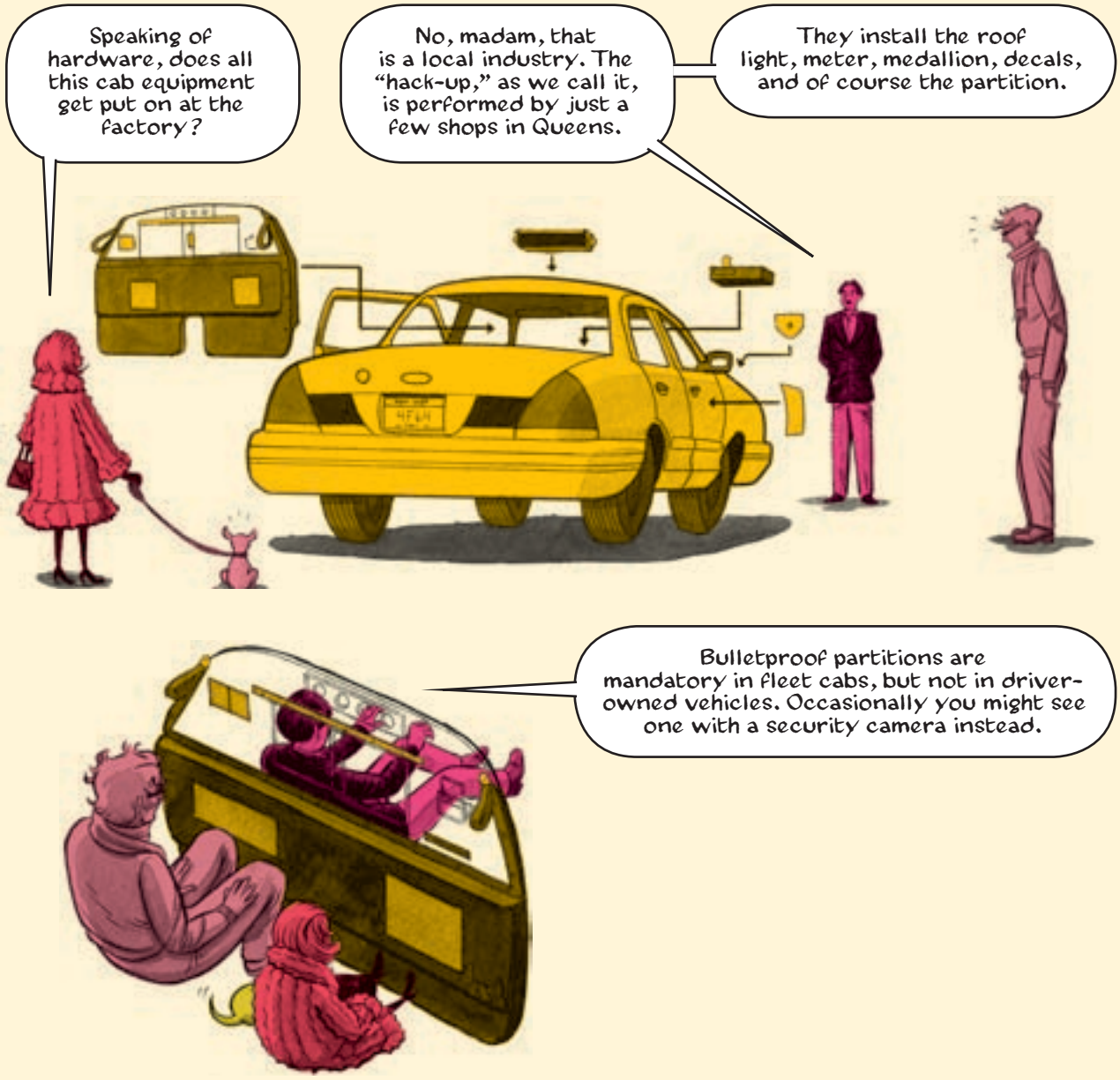
TLC-LICENSED TAXI SERVICES: A COMPARISON

	YELLOW CABS	FHV: 'BLACK' CARS	FHV: LIVERY CABS (a.k.a. community cars or car services)
HOW MANY ARE THERE?	13,087 (24%)	 ~10,000 (~19%)	 ~25,000 (~46%)
WHERE AM I LIKELY TO FIND THEM?	Manhattan below 125th St., plus airports.	 Many in Downtown and Midtown Manhattan, plus airports.	 Many in Upper Manhattan, Brooklyn, Queens; also Bronx, Staten Island.
HOW DO I GET ONE?	Street hail only.	 Call my company's service; no legal street hailing.	 Call any neighborhood service; no legal street hailing.
WILL I PAY A STANDARDIZED FARE?	Yes, TLC regulates fares.	 Maybe. Unregulated, but many customers ride under contract rates.	 No. Fares lightly regulated and variable.
CAN I EXPECT CONSISTENT SERVICE?	Maybe. Service regulated, but variable.	 Yes. Maintained by market pressure, less regulated than yellow cabs.	 Maybe. Service is less regulated than yellow cabs and varies.
HOW CAN I PAY?	Cash, soon all will accept credit cards.	 Cash, credit card, or on account.	 Mostly cash, but credit cards accepted.

BESIDES YELLOW CABS, WHAT OTHER FOR-HIRE VEHICLES ARE ON THE STREETS?

This chart compares the city's iconic yellow cabs with the two most common for-hire vehicle (FHV) services, black cars and livery cabs. These three forms of service comprise more than 90% of the 54,000+ vehicles licensed by the New York City Taxi & Limousine Commission. Other regulated vehicles include several thousand limousines, ambulettes (officially known as paratransit vehicles), and commuter vans, which seat between 9 and 20 passengers and travel only within specific geographic zones. However, of all these services, only yellow cabs are allowed to pick up passengers who hail them on the street—all other street-hail service operates outside legal scope.

THE HACK UP



WHAT'S GOOD ABOUT THE CURRENT TAXI FLEET? AND WHAT COULD BE IMPROVED?

Given the tough driving conditions that New York's cabs must withstand—a 24/7 regime of stop-and-go traffic, weather extremes, and bouncy roads—the current prevalence of Ford Crown Victorias is pretty sensible: the vehicles are affordable workhorses, safe and spacious for their class, and easy to maintain. New York's fleet is also quite new, with a mandatory three-year retirement age extended to five years only if the car is driver-owned or a hybrid or accessible model. Still, cabs could be more user-friendly. Current taxis offer little in the way of amenities for drivers who spend up to 12 hours in the front seat. Passengers say that it is hard to get in and out of the back, hard to see over the partition, and difficult to accommodate luggage and children. Although more than 80% of Crown Vics feature 'stretch' interiors, providing 45.6" of legroom, the car also takes up nearly 18 feet of road length—more than may be appropriate on a small island.


Does all this stuff get taken off when the cab is retired?
New York cabs do not retire, madam...
Strict city regulations require cabs to be taken off New York streets after three to five years of service.
LAST EXIT CHICAGO
They are then shipped to other cities with less restrictive regulations, where they continue to operate as cabs.

ALON TAXI AND HACK GARAGE
ASTORIA, QUEENS

HOW DO CARS BECOME CABS?

A Ford Crown Victoria costs approximately $27,500. The 'hack-up,' the process that transforms the new vehicle into a hack vehicle—that is, a taxicab—costs another $3,000. Taxi vehicles are typically painted yellow by the original manufacturer, but the hack-up takes place in Queens or the Bronx, where specialized taxi garages add a range of functional and identifying elements, all required by the TLC. The roof light and the medallion badge are attached to the car's exterior. Stickers with fare information are affixed to the doors, and the medallion number is stenciled on. Inside, the meter is connected and a partition is usually installed. (Owner-operators are exempt from the partition requirement, and some choose not to install one, as tips are usually better without.) The technology enhancements mandated for roll-out in 2007 will add several more steps—and approximately $5,000—to the average hack-up process.

Darwin Pasato (above), a hack-up mechanic, installs a driver-information monitor on the dash of a new cab. He connects this new meter, or "DIM", to a new passenger information monitor or "PIM" on the customer side of the partition. This key TLC technology enhancement will allow passengers to view real-time route maps, look up TLC information en route, and at the end of the ride, pay the metered fare on screen with a credit card. Meanwhile, this road-weathered Crown Victoria (left) gets a body and paint makeover so that it can pass its next inspection.

The Alon garage is dedicated to yellow cabs. Here, new vehicles arrive as regular cars and leave ready for the road as New York City taxicabs, with the medallion affixed to the hood, TLC-compliant partitions and meters installed, roof-lights and plates attached. All that remains is to pass the TLC's inspection (see pages 68-71). The mechanics also perform routine maintenance on cabs in service, changing rooftop ads and doing body or engine work.

USING TAXIS

YELLOW PAINT MAY UNIFY THE CAB FLEET, BUT TAXI USERS—PASSENGERS AND DRIVERS—ARE UNITED BY A COMMON TAXI EXPERIENCE. MILLIONS OF TIMES A YEAR, ONE STRANGER GETS A RIDE FROM ANOTHER, A PREDICTABLE FARE CHANGES HANDS, AND BOTH GO ON THEIR WAY.

SOON, NEW TECHNOLOGIES WILL DELIVER ADDITIONAL INFORMATION AND SERVICES TO TAXI USERS, JOINING THE BODY OF SOCIAL CUSTOM, URBAN SAVVY, TRAFFIC PATTERNS, AND PURE LUCK THAT AFFECT TRANSACTIONS BETWEEN RIDERS AND DRIVERS TODAY.

WHAT WILL REMAIN UNCHANGED ARE THE FUNDAMENTAL MOTIVATIONS AND INTERACTIONS THAT MAKE UP THE TAXI EXPERIENCE.

TAXI TRANSACTIONS & SERVICES

What do you do if the passenger discovers that she's out of cash?

In that case I keep the meter running while the passenger uses a cash machine.

But changes are occurring that will help prevent this situation.

Recently a 250-cab fleet outfitted all its cars with credit card readers.

This, however, is only the first step...

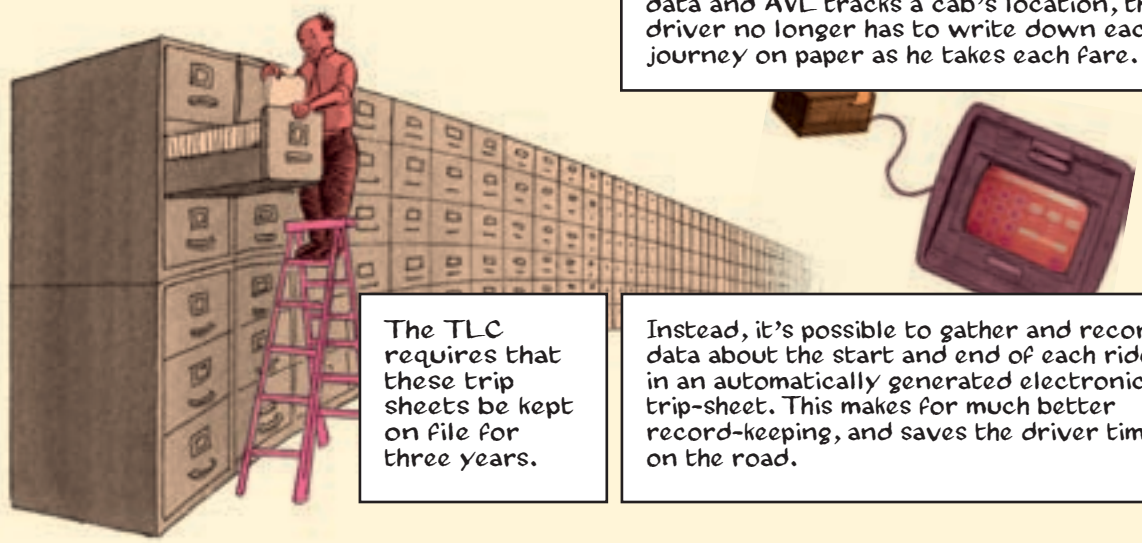
Soon every cab will see the installation of the Passenger Information Monitor (PIM). This device will allow for real-time credit and debit card transactions.

Automatic Vehical Location Systems (AVL) will also help with an ongoing problem for us: paperwork. The meter records *fares* electronically, but *trips* are written by hand.

Plus it will provide safety and public service information, as well as maps, to replace the stickers you see on the partition.

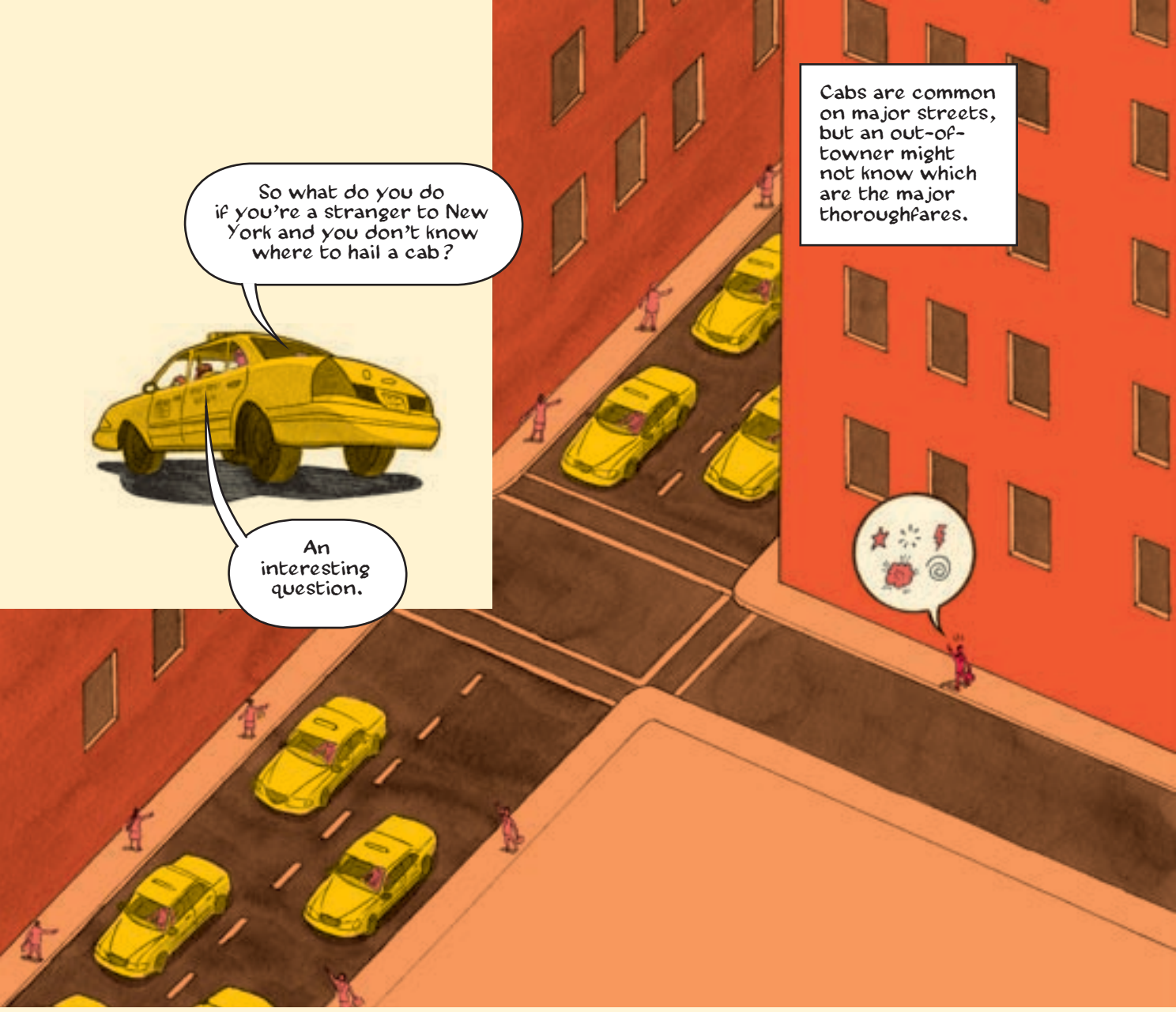
AVL technology will allow the passenger to see the cab's position on the map.

So, since meters automatically record fare data and AVL tracks a cab's location, the driver no longer has to write down each journey on paper as he takes each fare.

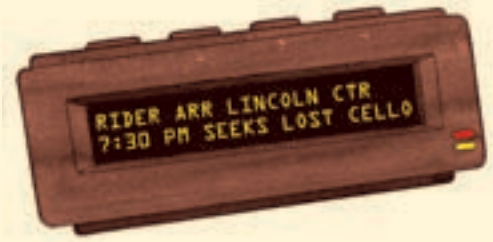


The TLC requires that these trip sheets be kept on file for three years.

Instead, it's possible to gather and record data about the start and end of each ride in an automatically generated electronic trip-sheet. This makes for much better record-keeping, and saves the driver time on the road.

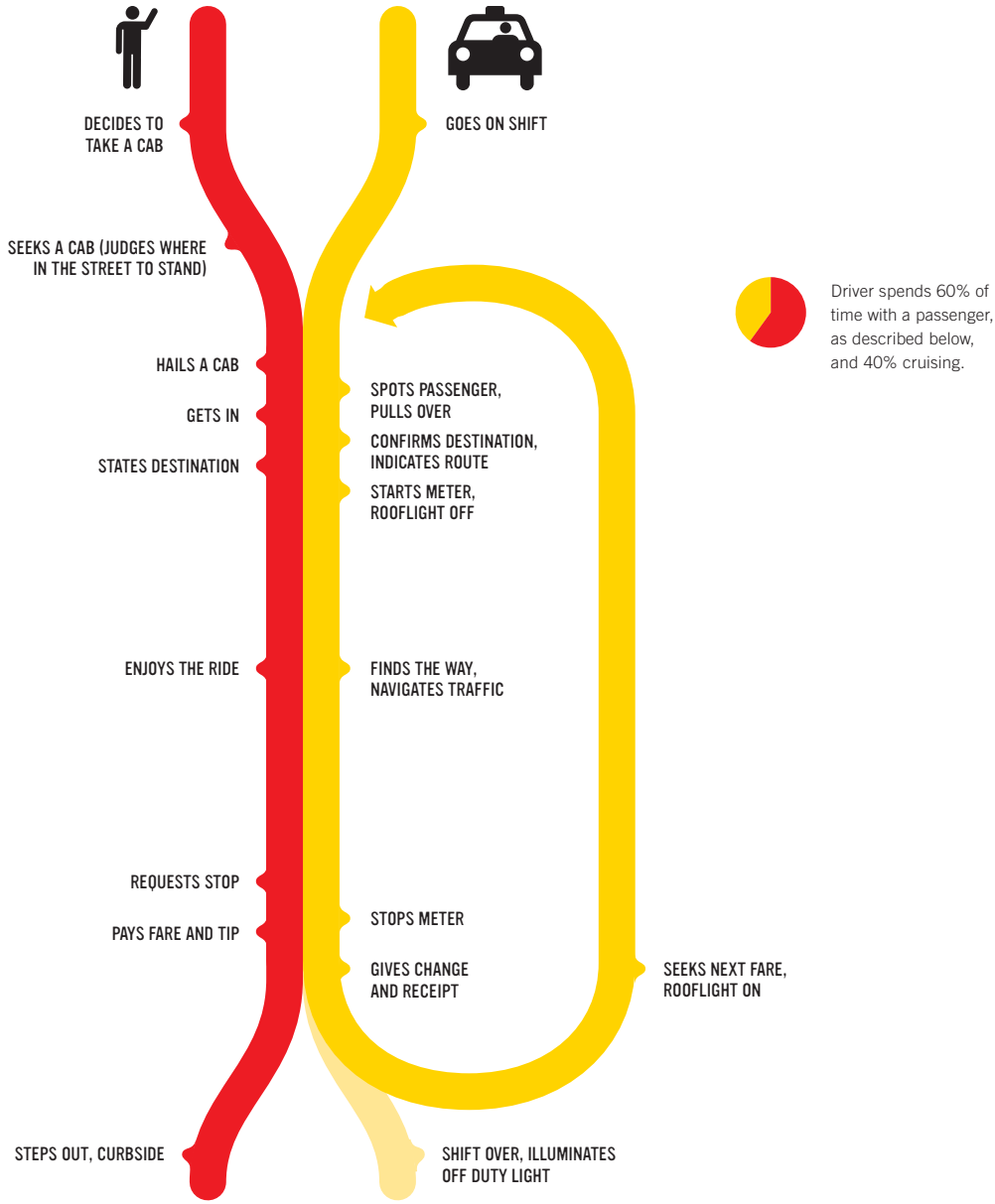


It may be possible to find lost articles quickly. This is a newly installed short messaging service (SMS) unit.



The TLC can broadcast messages to all cabs, including traffic information, emergency instructions, and lost-property alerts.

UNDERSTANDING THE TYPICAL CAB RIDE



WHAT HAPPENS DURING A CAB RIDE? WHAT INTERACTIONS DEFINE THE TAXI EXPERIENCE?

Taxis operate within the geographical landscape of the city's streets, avenues, bridges, and tunnels. Though it's less obvious, every cab also exists in a "communications landscape" that includes not just conversations between riders and drivers, but also meter readings, tripsheets, inspection reports, licenses, 1010 WINs travel headlines, calls to 311, text messages, relief-stand hearsay, neighborly advice, receipts, public-service announcements, maps, and advertisements. All of these points of exchange and information delivery influence how New Yorkers perceive their taxi experience.

The graphic above outlines the transactions that make up a typical cab ride. Key moments include the point of connection between rider and driver, the exchange of destination and route information, the lull of the ride itself, and the arrival and payment process. When considering how the taxi system works today—and how it might be improved in the future—it's helpful to consider how each of these phases of the ride might be better informed, easier to carry out, and more enjoyable for both passenger and driver.

28TH AND LEXINGTON MANHATTAN

WHERE DO CABBIES TAKE A BREAK?

There are two kinds of taxi stands in New York City—one for passengers and one for drivers. Active taxi stands, like those at train stations and airports, are used to match waiting passengers with available cabs. Relief stands are designated stretches of curb, reserved for taxis, where drivers are allowed to park for free for up to 60 minutes. In some areas, restaurants and shops catering to driver tastes have opened near relief stands or gas stations, and these shops have become informal social clubs, where drivers eat, use restroom facilities, post announcements, and meet to hand-off taxis at shift changes.

Within a block of East 28th Street and Lexington Avenue, two relief stands, a medallion leasing office, and a cluster of cafés and newsagents serve cab drivers relaxing between shifts. Sangeet House (above) sells South Asian DVDs, CDs, and magazines, as well as paan, freshly prepared Indian chewing tobacco. Portraits of Allama Iqbal, Pakistani poet-philosopher, and Mohammed Ali Jinnah, founder and first Governor General of Pakistan, decorate the walls of nearby Haandi (top right), a café where Indian, Pakistani, and Bangladeshi drivers hang out. At New Naimat Kada café on Lexington (bottom right), the satellite TV offers drivers programming for a similarly international crowd.


Smoking

LAHORE CAFÉ
CROSBY AND HOUSTON, MANHATTAN

As one shift ends and another begins, drivers converge on the gas station at Houston and Lafayette to trade cars and refill the tank. Across the street, at Lahore, a tiny café, they refuel, too—meeting friends, and grabbing chai, samosas and headache tablets.

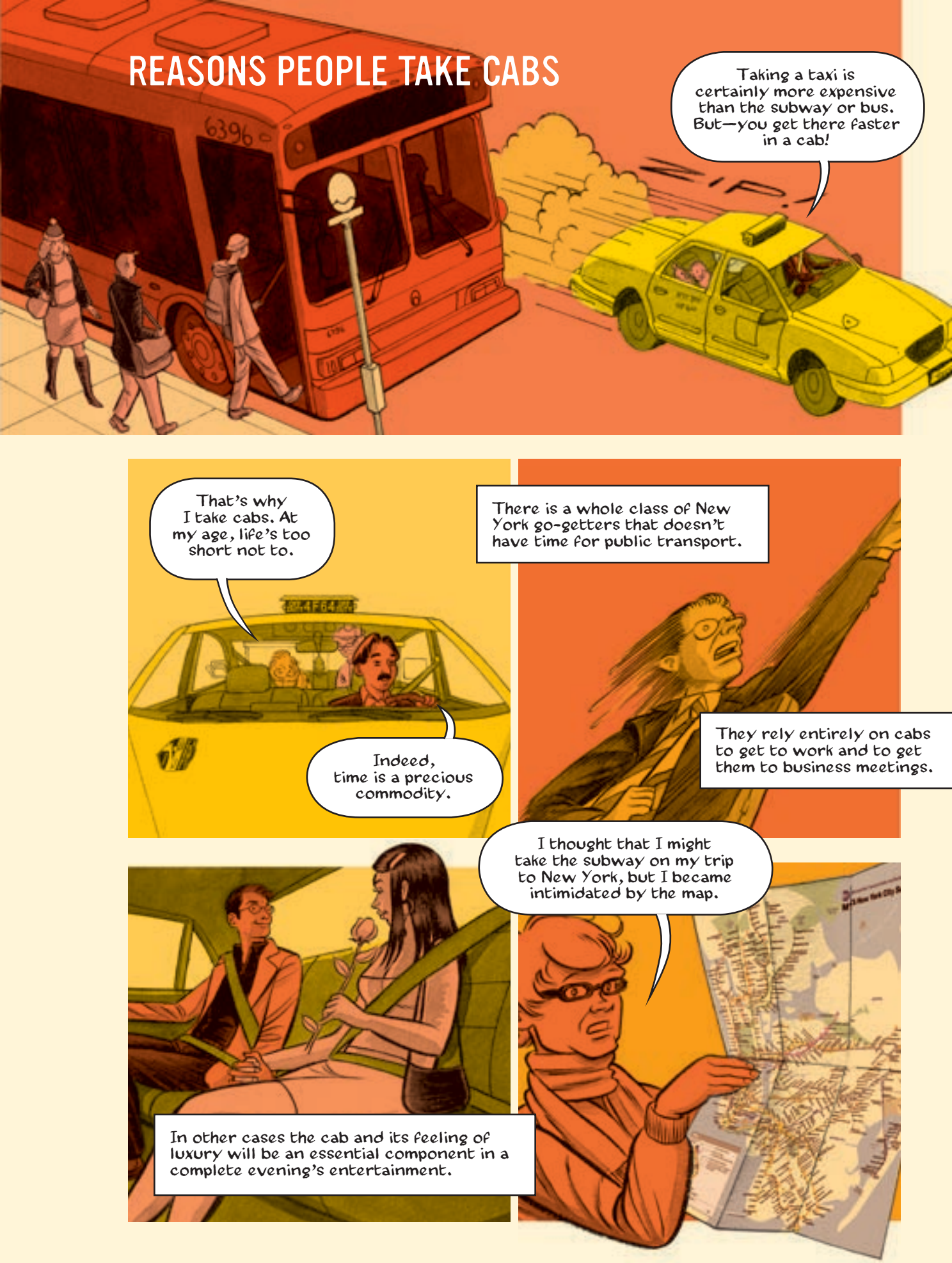

Advil
TYLENOL
EXTRA
BAYER
SNICKERS
VICKS Drops
TUC
LU
Candi

TAXI PASSENGERS

Surveys have shown that while a quarter of our passengers have an annual income in excess of $150,000, another quarter earn less than $25,000 per year.

WHO TAKES CABS? AND WHERE?

There are more than 470,000 taxi trips per day. A significant share of those trips—more than 10%—are taken by people commuting to or from work, largely in Manhattan. In fact, more than 85% of all taxi trips begin or end in Manhattan, and at some times of day, more than half of all vehicles in Midtown are yellow cabs. Given such wide availability, it's not surprising that Manhattanites are much more likely to take a cab than residents of any other borough, with denizens of the Upper East Side topping the list.


REASONS PEOPLE TAKE CABS
6396
Taking a taxi is certainly more expensive than the subway or bus. But—you get there faster in a cab!
That's why I take cabs. At my age, life's too short not to.
Indeed, time is a precious commodity.
There is a whole class of New York go-getters that doesn't have time for public transport.
They rely entirely on cabs to get to work and to get them to business meetings.
I thought that I might take the subway on my trip to New York, but I became intimidated by the map.
In other cases the cab and its feeling of luxury will be an essential component in a complete evening's entertainment.

If you are on vacation, sir, it is much nicer to travel above ground. Out the windows you can see the sights, the people, the architecture...

And if you are lucky you get a driver like me who will tell you all about the city!

When other ways of getting around prove impractical, the cost of an occasional cab ride seems most reasonable, and minimal compared with the cost of buying, maintaining, fueling, insuring, and parking a car.

And as more cabs become hybrid and clean-fuel vehicles—so far there are over 300—they're helping make New York a cleaner, healthier place to live. In fact, the city's Mayor just issued a mandate that by the year 2012 all city taxis must run on hybrid engines!

YELLOW-CAB SERVICE: FOUR PERSPECTIVES

USABILITY

ARE CABS SAFE?

Inspected three times a year by TLC for 150 visual, tire, brake, and meter indicators

ARE CABS USER FRIENDLY?

Only 81 are wheelchair accessible.

Not designed for easy on/off when passengers have packages, children that require child seats, or impaired mobility

ARE CABS ENJOYABLE & COMFORTABLE?

Crown Victorias provide 45.6" of rear legroom and take up to four passengers

Seatback monitors will soon provide maps, information, and credit-card payment options

ECONOMIC VALUE

ARE CABS A FAIR DEAL FOR RIDERS?

Passengers spend more than $2 billion on taxi fares each year

Average fare is $9.61—cheaper than in other major cities

ARE CABS VALUABLE FOR OWNERS?

Each medallion is worth about $500,000—a real asset that can be bought, sold, or mortgaged

Finance payments on a single medallion cost usually owners around $1,500 a month

Owners can lease their medallions for $105 to $130 per shift

CAN DRIVERS MAKE A DECENT LIVING?

After expenses, drivers usually clear anywhere from $150 to $250 per half-day shift

EFFICIENCY

WHEN DO CABS RUN?

Most are on the road 24/7, driven in two half-day shifts

Supply and demand fluctuate throughout the day

AND FOR HOW LONG?

Go from brand new to retirement in 3 to 5 years

WHERE ARE CABS USED?

To and/or from Manhattan, 85% of the time

On city streets at moderate speed, in stop-start traffic, rather than on freeways

BY HOW MANY PEOPLE?

240 million passengers per year

Vast majority of trips carry only one or two passengers

Occupied 35% to 75% of the time, depending on time of day

SUSTAINABILITY

ARE CABS ENERGY-EFFICIENT?

Crown Vic has a 4.6L v8 224 hp engine that gets 15–23 mpg (2007, US EPA).

Over 400 'green' cabs in the fleet, mostly hybrid-electrics, with many more on the way—a May 2007 Mayoral mandate requires all taxis be hybrids by 2012.

Hybrids have efficiency ratings as high as 48 mpg (Toyota Prius) (2007, US EPA)

DO THEY POLLUTE?

Cab fleet currently generates four tons of air pollution daily

ARE CABS RECYCLED OR REUSED?

Most after-market taxi components are not designed for easy recycling or reuse

NYC cabs often see a second life in other cities once they pass retirement age here

HOW DO TAXIS AFFECT NEW YORK CITY?

Taxis have a profound impact on the image of the city—just try to imagine New York without them. But beyond the bright yellow presence, taxis are also the most obvious aspect of a major local industry, a vital mode of urban transit, and components of New York City's environment and public realm. Taxis generate tens of thousands of jobs, represent billions in invested capital, support the nation's most used public transportation system, and are on the front lines of the city's efforts to reduce greenhouse-gas emissions. Perhaps most overlooked, cabs are also designed objects, products of manufacturing and fabrication processes that affect how they're ultimately experienced by users. By understanding the complex economics, regulations, design choices, and social impacts that are tied to the simple act of hailing a cab, New Yorkers can begin to ask how the taxi system can be more efficient, green, and usable for all.

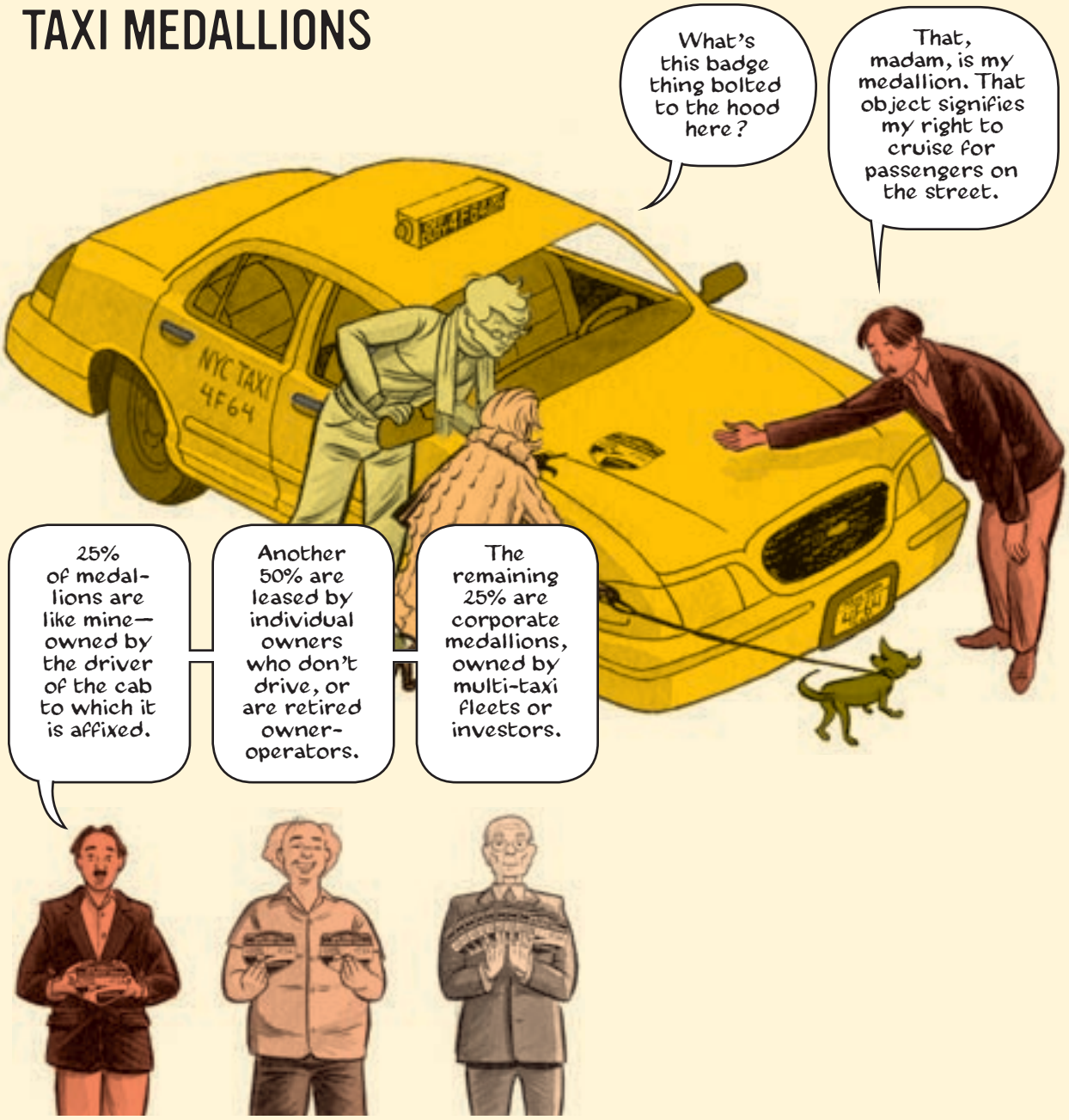
OWNING AND OPERATING TAXIS

THE CITY OF NEW YORK REGULATES TAXIS, BUT THE TAXI INDUSTRY—DRIVERS, INDIVIDUAL MEDALLION OWNERS, FLEETS, AND A NETWORK OF BROKERS AND AGENTS—EXERTS AT LEAST AS MUCH CONTROL OVER OPERATIONS AS THE TLC DOES.

WITHIN CERTAIN GUIDELINES, MEDALLION OWNERS RUN PRIVATE BUSINESSES, DECIDING WHAT VEHICLES TO BUY, HOW THEY SHOULD BE MAINTAINED, AND WHO SHOULD DRIVE THEIR CABS. MEANWHILE, DRIVERS CAN INVEST IN THE SYSTEM AS ENTREPRENEURS, WORK PART-TIME, OR DO SOMETHING IN BETWEEN.

A WEB OF RELATIONSHIPS, FINANCIAL SERVICES, AND PHYSICAL LOCATIONS WITHIN THE CITY LANDSCAPE SERVE THIS WORLD OF BEHIND-THE-SCENES TAXI OPERATIONS.

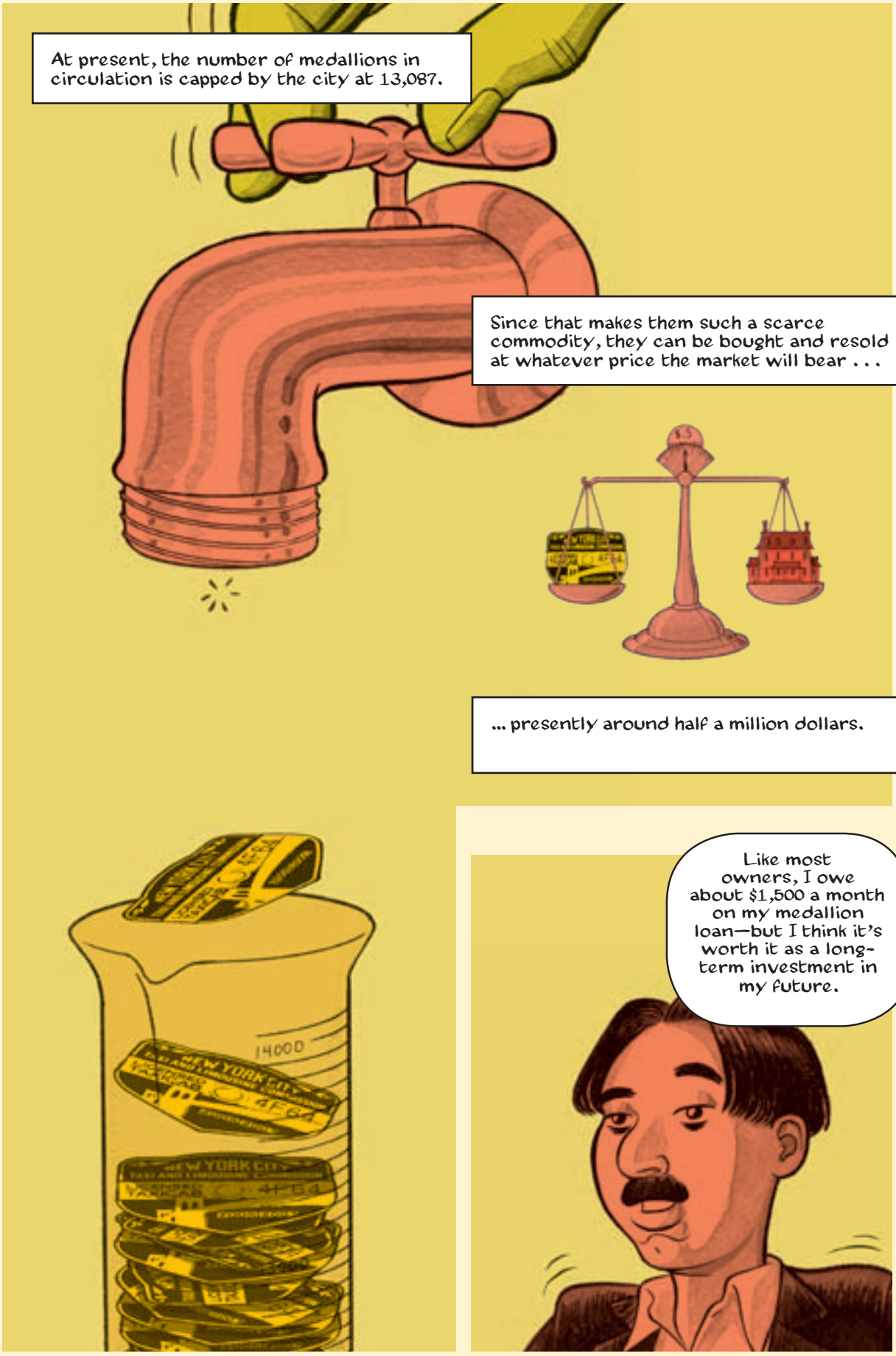
TAXI MEDALLIONS



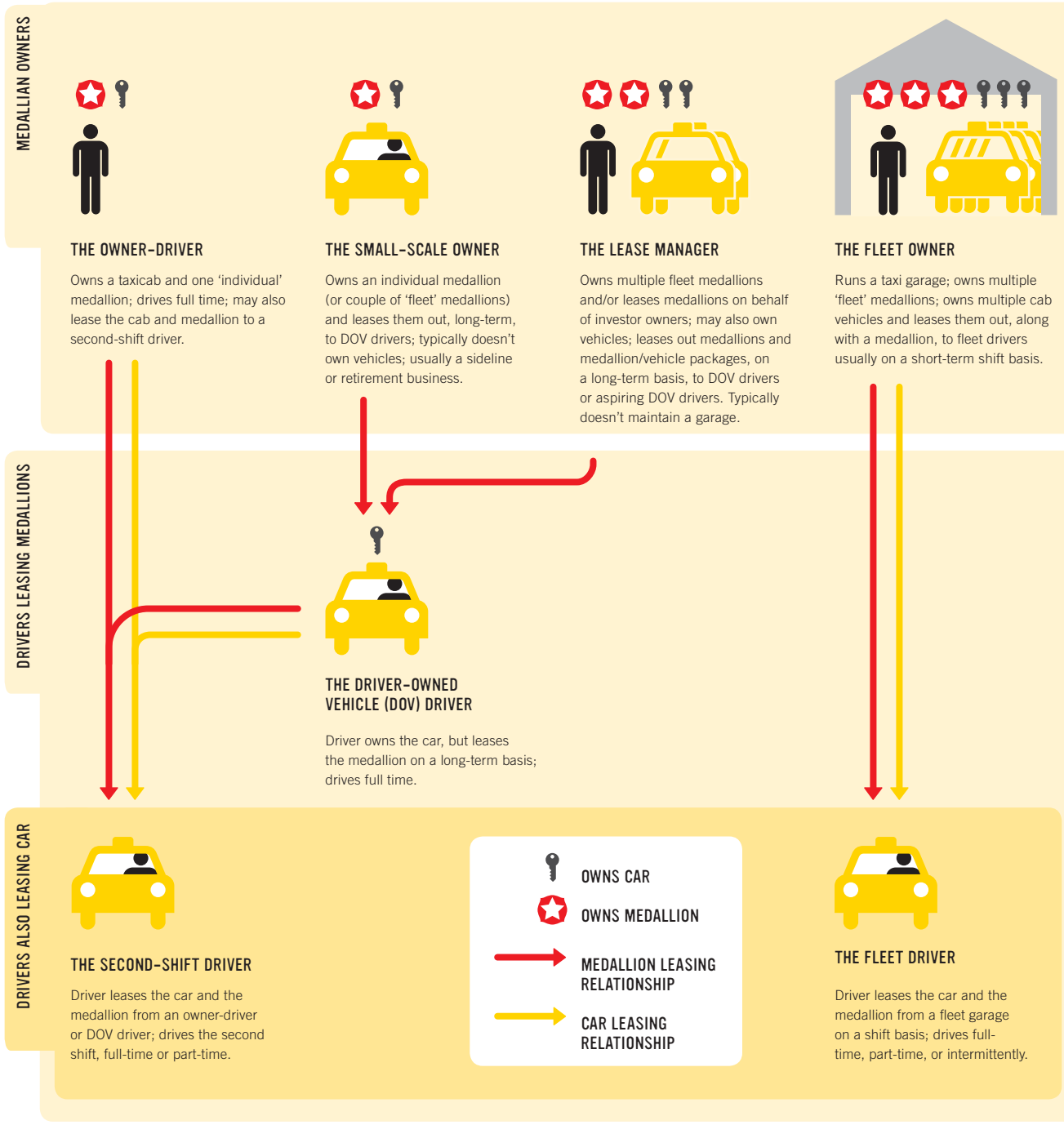
WHY DOES NEW YORK CITY ISSUE TAXI MEDALLIONS?

The present medallion system dates to 1937, when the City passed the Haas Act. Intended to curb hoards of cruising cabs and bolster driver incomes, the act prohibited the release of new taxi licenses. Cab numbers dropped from 21,000 to 11,787 as licensees gradually left the industry. Until 1996, the number had been frozen at that level for more than 50 years. The City issued 400 medallions in 1996 and 1997, with 900 more between 2004 and 2006, bringing the total number of medallions to 13,087.

The Haas Act also established two medallion types, corporate and individual. Corporate (or 'fleet') medallions are owned by multi-taxi fleets or investors. While no owner of record holds more than a handful of medallions, providing protection from major litigation, corporations and holding companies consolidate control of corporate medallions in relatively few hands. Individual medallions were intended to ensure ownership by rank-and-file drivers. By the 1980s, however, individual medallions were being leased out, with owner-drivers ever more absent from the industry. Consequently, since 1990 TLC has required purchasers of individual medallions to drive at least 210 shifts per year, gradually restoring the balance of owner-drivers.


At present, the number of medallions in circulation is capped by the city at 13,087.
Since that makes them such a scarce commodity, they can be bought and resold at whatever price the market will bear . . .
... presently around half a million dollars.
Like most owners, I owe about $1,500 a month on my medallion loan—but I think it's worth it as a long-term investment in my future.

MEDALLION OWNERSHIP AND OPERATIONS MODELS



WHO OWNS AND OPERATES CABS?

New York's taxis are owned and operated under a number of business models. In the most straightforward case, a driver owns his cab vehicle and a medallion. Most of these owner-drivers are required to drive at least 210 shifts per year; some also enter into partnerships with a second-shift driver. At the opposite end of the scale, fleet owners may own hundreds of cabs and medallions, which they lease out to a rotating crew of full-time, part-time, and occasional drivers. DOV (driver-owned vehicle) drivers fall somewhere in the middle: having purchased a cab vehicle, they take out a long-term lease on a medallion, either from a small-scale owner (often a retired driver himself) or from a medallion lease manager.

RONART FLEET GARAGE
LONG ISLAND CITY, QUEENS

HOW DO TAXI FLEETS DO BUSINESS?

A family-owned business for three generations, the Ronart Leasing Corporation now operates one of the largest taxi fleets in New York City. Ronart's garage, located in Long Island City, just over the Queensboro Bridge from Manhattan, is the home base of over 300 yellow cabs. More than 1,000 drivers regularly get their cab from Ronart, paying from $100 to $130 per half-day shift to lease a medallion and a vehicle, which is maintained by the fleet garage. Fees are higher for some evening shifts, which are more lucrative—and therefore more desirable—but all fees are subject to caps set by the TLC. Day-shift drivers pay Ronart when they return the cab to the garage, while nighttime drivers pay up front at the beginning of their shift. Drivers also pay to fuel the cab and are responsible for some costs in the event of an accident; however, other than the lease fee, they do not owe a share of passenger fares to the fleet.

Ronart, like many fleet garages, has on-site mechanics who perform maintenance and body work. The ghosts of hundreds of medallion numbers (top left) remain on the walls of the spray booth, where they were tested before being stenciled onto cab exteriors. On any given day, the garage's dispatch office distributes keys to the fleet's cabs (right) to scores of shift drivers.

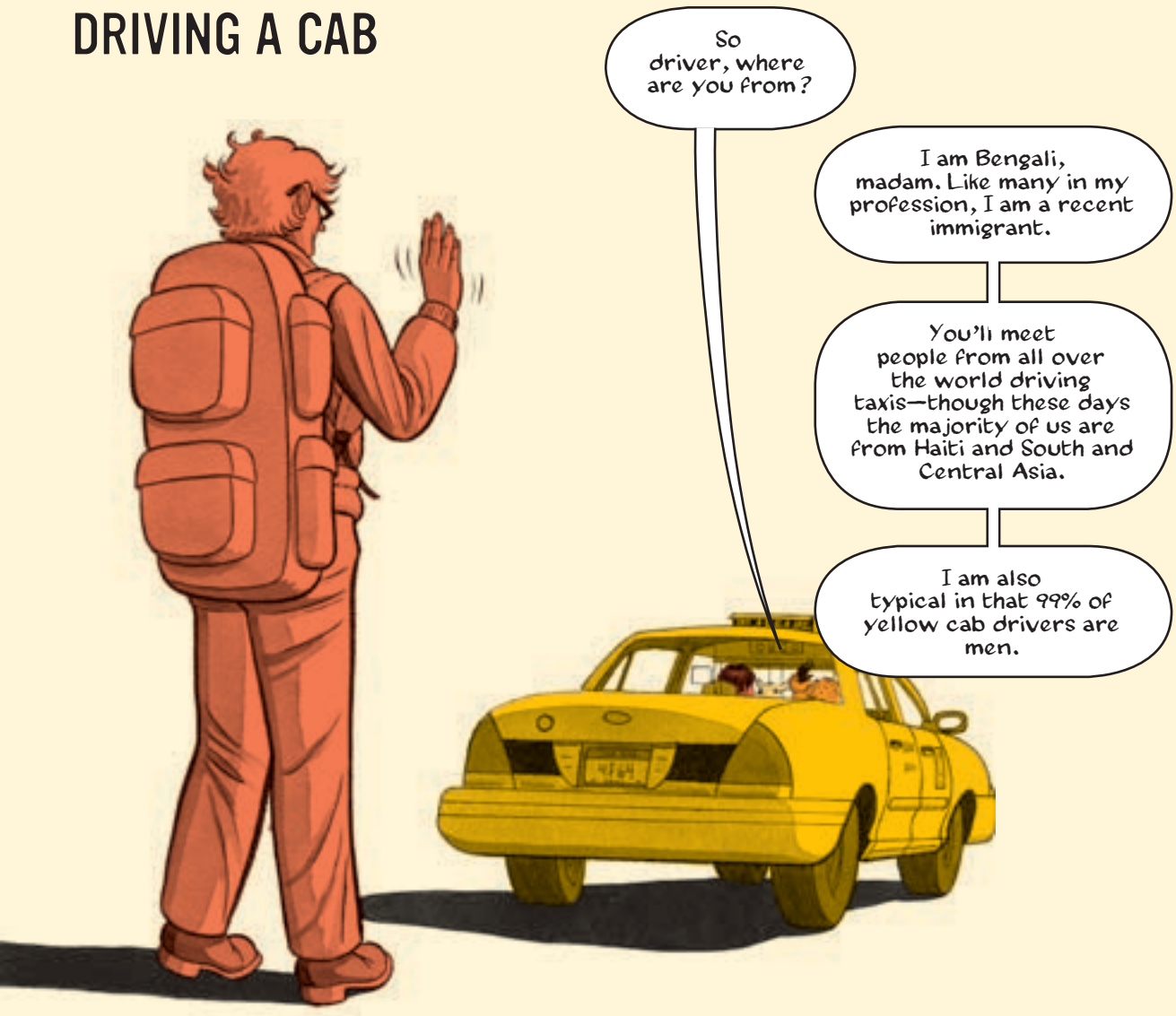

301
ROAD CAR

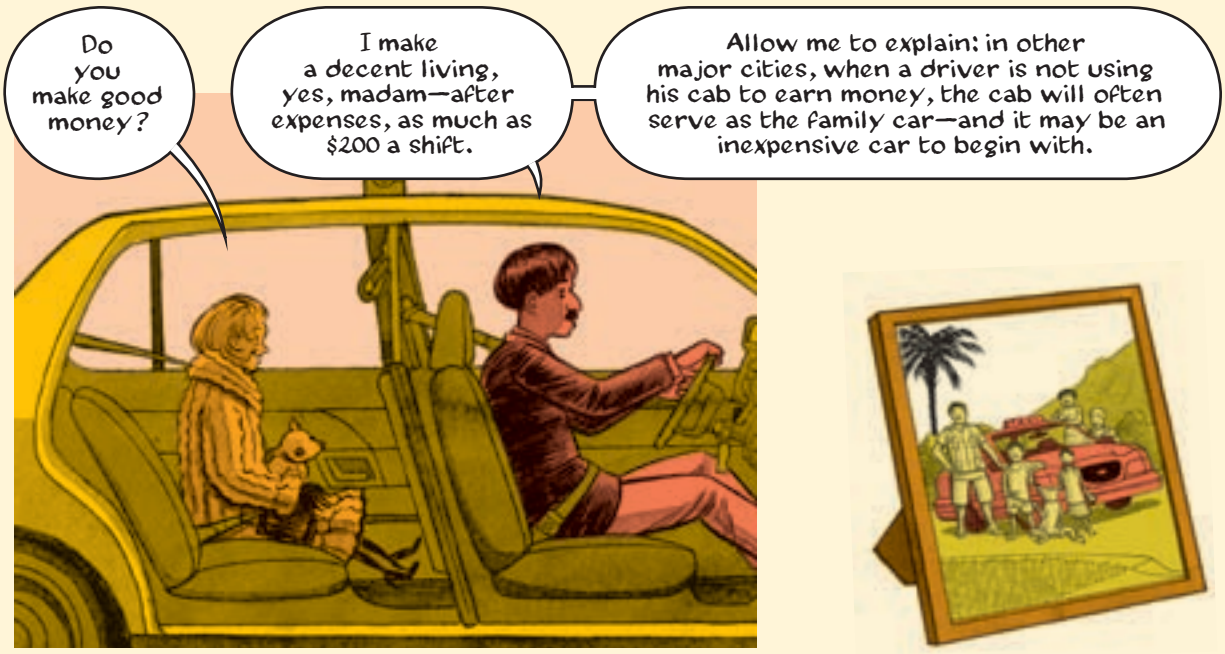
All over Long Island City and elsewhere in the boroughs, drivers begin their shift at a fleet garage, where they collect a cab to begin their work. The cabs in the garage and the sea of yellow vehicles in the parking lot are often more distinct than the adjacent administrative offices that run them.

Drivers who have a hack license—but own neither a cab nor a medallion of their own—can find work driving fleet cabs as independent contractors. As seen here, a driver pays the garage a flat lease fee for a taxicab and medallion; he takes home whatever fares he earns in a shift. He may lease on a daily or longer-term basis, driving as often or infrequently as he likes—flexibility that appeals to students and to immigrants who prefer to work intense stretches before returning home for periods of time.


Name
Days
ALL MEDALLION WILL
Polar
Spring
SHARP

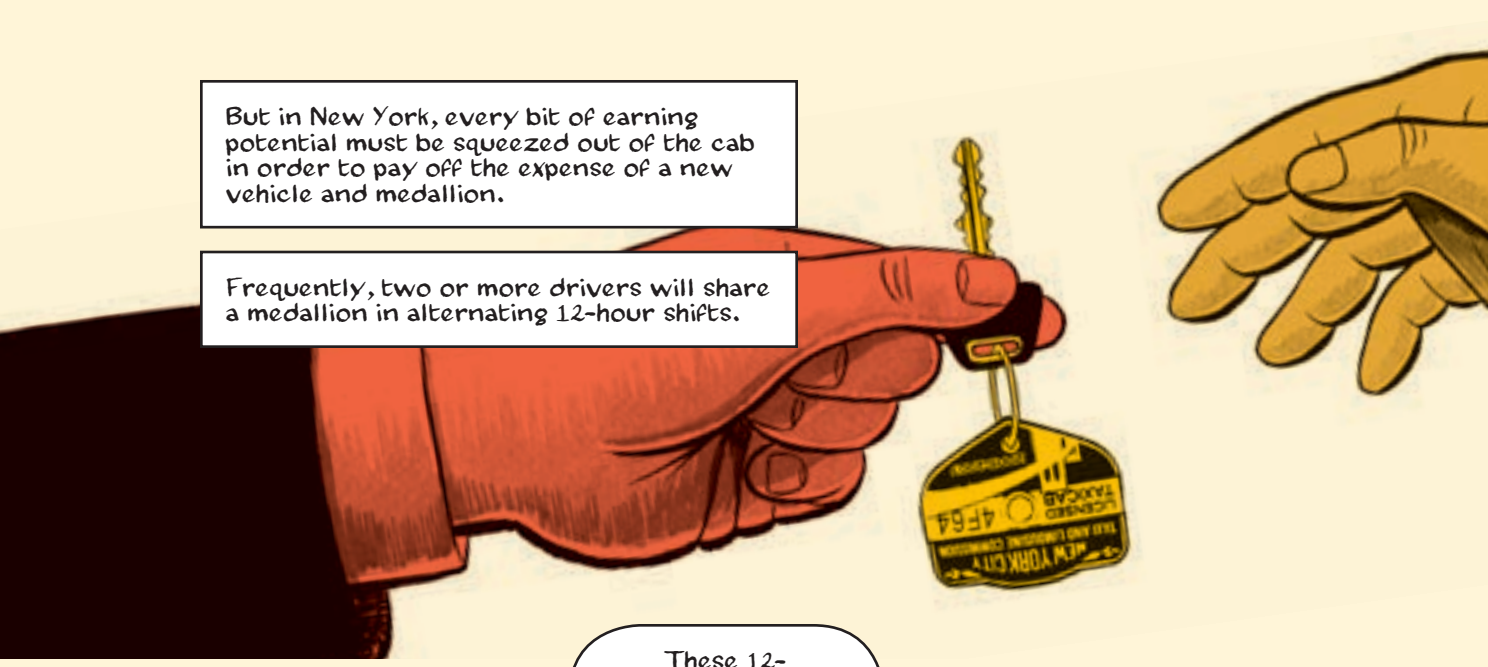
DRIVING A CAB





But in New York, every bit of earning potential must be squeezed out of the cab in order to pay off the expense of a new vehicle and medallion.

Frequently, two or more drivers will share a medallion in alternating 12-hour shifts.



Among the drivers now on the road, a quarter will leave the job within their first year. Half will quit within four years, and almost three-fourths will hang it up within six years.*

*Source: Schaller, Bruce (2006). *The New York City Taxicab Fact Book.*

CENTRAL TAXI HOLD, JFK AIRPORT, QUEENS

WHAT HAPPENS BEHIND THE SCENES AT THE AIRPORTS' TAXI FACILITIES?

Typically, more cabs are waiting at the city's airports than there are interested passengers. In the past, cab supplies would also be unevenly distributed across terminals, leading to cab gluts at one arrivals area and a lack of supply at another. In 2001 the Port Authority opened the Central Taxi Hold at JFK, a four-acre staging area where cabs are required to wait before being dispatched to terminals. The lot combines parking for 700 cabs with driver facilities, including restrooms, a 24-hour cafeteria, and space for prayer. (LaGuardia has a smaller lot.) Some drivers prefer the downtime—and the near guarantee of a hefty fare—to cruising the city's streets.

Drivers parked in the hold lot at JFK (above) might wait up to a couple of hours to be dispatched to pick up passengers from an arrivals terminal. While they wait, drivers may pass the time napping, studying, or socializing; there's the occasional match of pick-up soccer in the lot, and domino games (top right) take place in the airport cantina. Behind the cantina, Muslim drivers share afternoon prayers (bottom right). Safety cones hold down the prayer mats, protecting them from the elements.

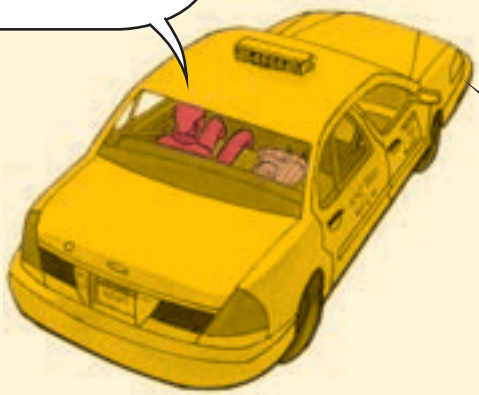
Late afternoon at JFK: From inside one of the security offices, cabs can be seen exiting the lot while others arrive.

REGULATING TAXI SERVICE

WHILE THE CITY OF NEW YORK DOESN'T OWN OR OPERATE THE YELLOW-CAB FLEET, IT EXERCISES STRICT CONTROLS ON MANY ASPECTS OF THE TAXI SYSTEM. SINCE 1971, WHEN IT WAS SPUN OFF FROM THE NYPD, THE NEW YORK CITY TAXI & LIMOUSINE COMMISSION HAS BEEN RESPONSIBLE FOR SETTING STANDARDS FOR TAXI VEHICLES AND SERVICE, LICENSING INDUSTRY PARTICIPANTS, AND ENFORCING COMPLIANCE WITH TAXI REGULATIONS.

THE NEW YORK CITY TAXI & LIMOUSINE COMMISSION

What, exactly, is the Taxi and Limousine Commission?



The Taxi and Limousine Commission (TLC) is a city agency.

It is the supervisory body regulating all matters pertaining to taxicabs.

The TLC sets standardized fares and establishes rules for vehicle safety that owners and operators must abide by.

The TLC is responsible for writing policy that allows owners and drivers to operate profitably, while also generating revenue for the city.

The TLC tests and licenses drivers.

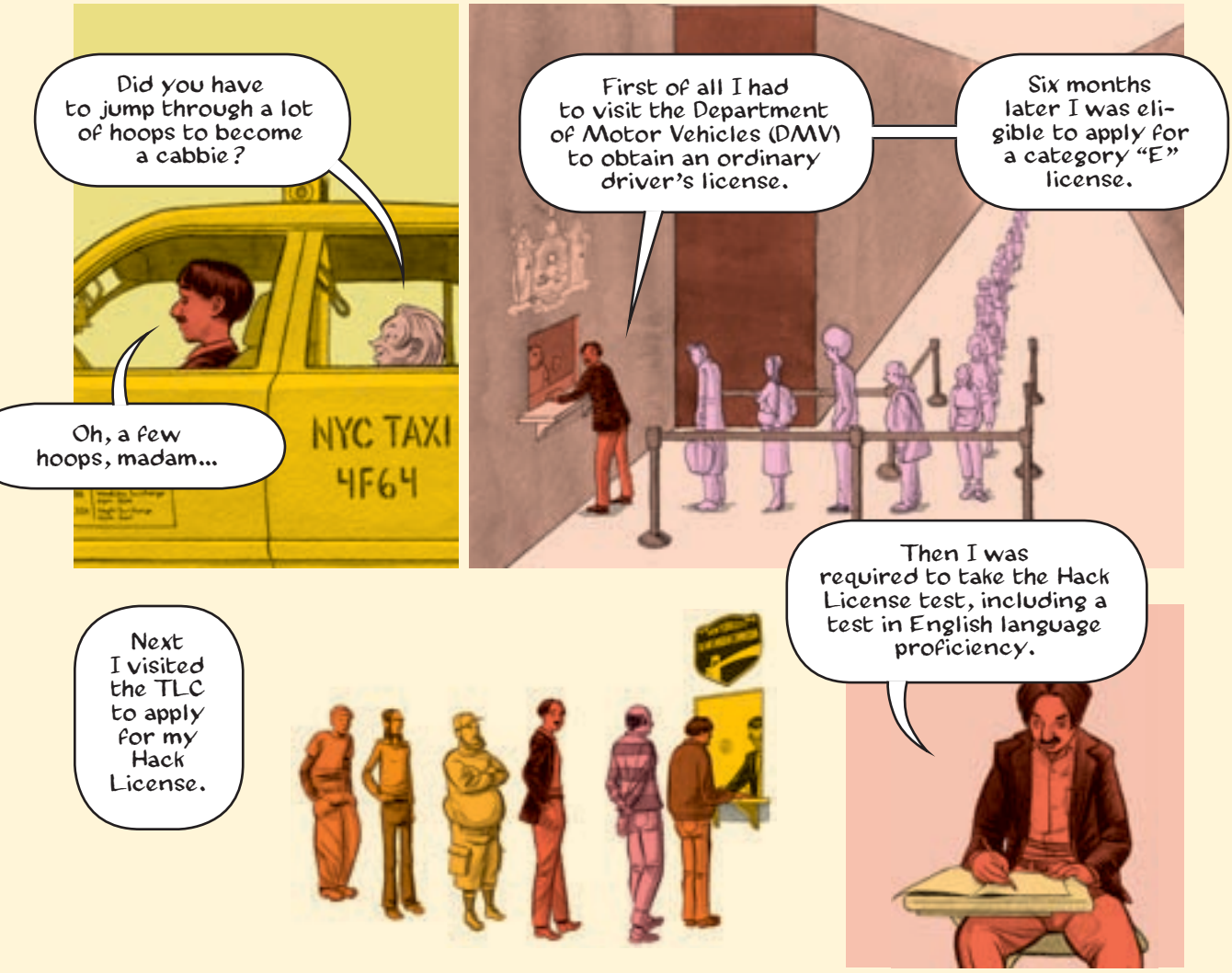
The TLC informs passengers with public service information...

...and protects them by hearing their complaints via the city's 311 telephone service.

TLC judges, officers, and inspectors enforce TLC regulations so that service is reliable.

The TLC is responsible for conforming to the overall agenda of New York City by acting as a public regulator of a private enterprise that in turn provides a public service.

BECOMING A TAXI DRIVER



YELLOW-CAB REGULATION: THE TLC'S ROLE

THE TLC DOES WHAT?	THROUGH WHAT MEANS?	SO THAT TAXI SERVICE:
SETS STANDARDS FOR DRIVERS 	TESTING AND LICENSING; ENFORCEMENT BY TLC, NYPD, ADJUDICATION BY TLC JUDGES	IS SAFE, EFFICIENT, AND PROVIDES A LIVING
SETS STANDARDS FOR VEHICLES 	VEHICLE MANDATES AND INSPECTIONS, VEHICLE AGE LIMITS, VEHICLE INSURANCE	IS SAFE, ACCESSIBLE, AND SUSTAINABLE
REGULATES TAXICAB OPERATIONS 	MEDALLION RESTRICTIONS, LEASE CAPS, OWNERSHIP AND BROKERING REQUIREMENTS	SUPPORTS A FAIR, EFFICIENT BUSINESS MODEL
PROTECTS AND INFORMS PASSENGERS 	FARE MANDATES, CUSTOMER-SERVICE REQUIREMENTS, 311 AND PUBLIC-SERVICE CAMPAIGNS	OFFERS EASY-TO-USE, FAIRLY PRICED TRANSPORT
SERVES PUBLIC INTEREST OF NYC 	INTER-AGENCY COORDINATION, PUBLIC OUTREACH, POLICY-MAKING AND LONG-TERM PLANNING	ENHANCES TRANSIT, SUPPORTS THE ECONOMY, MINIMALLY POLLUTES

HOW DOES THE TLC WORK?

The board of the TLC has nine members, eight of whom are appointed by the Mayor with the advice and consent of the city council. Five of the members, one from each of the city's boroughs, is recommended for appointment by a majority vote of the councilmembers of each respective borough. The board holds monthly public meetings to discuss TLC initiatives and rule changes. TLC divisions include administrative staff, who develop and revise agency policy and respond to industry and passenger issues; the licensing division, which registers drivers, vehicles, owners, and various industry agents and brokers; the adjudication division, which holds hearings related to taxi and FHV summonses; and the enforcement division, which conducts safety and emissions testing on all TLC-licensed vehicles and also enforces TLC service rules through undercover and other operations. In addition to these everyday operations, the TLC also carries out auctions of taxi medallions, performs outreach at industry conferences, and engages in a number of longer-range strategic activities, such as user surveying, technology development, and planning exercises like Taxi 07.

TLC LICENSING FACILITY, LONG ISLAND CITY, QUEENS

WHO DOES THE TLC REGULATE?

The TLC licenses and regulates over 50,000 vehicles and approximately 100,000 drivers, more than 40,000 of whom are medallion taxicab drivers. Applicants for a 'hack' license must present a Social Security card, be fingerprinted, and undergo a criminal-background check, among other requirements. After filing for a license, they must take a drug test, complete taxi school, and pass the TLC's taxi exam and English proficiency test. Total licensing costs run $450 to $600.

TLC also registers owners of taxicab medallions; medallion agents, who assist in the sale and purchase of medallions; taxicab brokers, who lease medallions and vehicles on behalf of owners; and taxi meter shops, which install and repair meters. TLC issues licenses to for-hire vehicle (FHV) drivers and car-service offices (known as 'bases'), as well as black-car, limousine, commuter-van, and paratransit vehicles and bases. Licensing procedures establish that applicants are in compliance with state and city laws and are qualified to provide service.

A machine at the TLC's Long Island City licensing facility prints and laminates hack licenses (top left), a driver's certification to operate a yellow cab—familiar to passengers from its usual location, affixed to a taxi partition. The TLC does more than license yellow-cab drivers: it also regulates for-hire community car bases and drivers, limo fleets and drivers, ambulette drivers and yellow-cab fleet owners and operators. Sets of files color-coded with blue tabs (right) denote the records of owners.


OWNERS

The TLC licensing facility is the cab industry's Department of Motor Vehicles, the administrative HQ for taxi and for-hire vehicle service across New York City. Drivers for all TLC-regulated vehicles—yellow cabs, car services, ambulettes, limos—come here to get licensed, renew a license, or change their license status. Across the hall, medallion owners and fleet operators file ownership-transfer and registration documents. Upstairs, drivers pay tickets or, if a complaint has been brought against them, face a TLC administrative law judge.


12

As the TLC enhances the services offered in cabs for passenger benefit, it is also automating its own behind-the-scenes processes. Here, a new driver has his prints taken, stored electronically, and associated with his TLC record. Fingerprints are used to verify that an applicant has no prior criminal convictions.

TLC INSPECTION FACILITY WOODSIDE, QUEENS

HOW ARE TAXIS TESTED FOR SAFETY AND EMISSIONS?

Three times every year, each of the more than 13,000 medallion taxicabs are inspected by the TLC. A 264-point checklist assesses vehicle condition through mechanical and visual inspections, and it certifies that vehicles are both road-worthy and in compliance with TLC mandates—everything from legible passenger information stickers to accurate fare meters. In addition, TLC's state-of-the-art testing center in Woodside, Queens, was the first large-scale facility to be certified by New York State DMV to carry out On-Board Diagnostic (OBD) II testing, which checks each cab's engine performance and emissions by connecting directly to the vehicle's on-board computers. TLC's Safety and Emissions Division (S&E) also certifies the 'hack-up' of every new cab and performs ongoing testing of new vehicle models to assess their suitability for use as a New York City taxi.

At the TLC's Woodside facility, an inspector (bottom right) performs a visual inspection; here he's checking the chassis and verifying that there's no leak in the gas tank. A computerized inspections process (top left) runs and records diagnostics for engine, tire, brake, and emissions tests. Interdepartmental clerical work (top right) is routed between the TLC's offices.


J.F.K.
STATEN ISLAND
RECTOR STREET
L.I.C.
J.F.K
STATEN ISLAND
RECTOR STREET
L.I.C.

Hose pipes on the testing floor extract exhaust for emissions diagnostics—and also maintain air quality for TLC staff who monitor tests and drive the taxis through each stage of the inspection. In order to keep a sharp focus, inspectors rotate from test to test, rather than performing one inspection over and over on multiple vehicles.

PART III:
STRATEG
FOR IMPR
THE TAXI

IES
OVING
SYSTEM

While the goal of the preceding illustrated guide is to provide a basic understanding of the taxi system today, the sections that follow attempt a critical analysis of four aspects of the system: usability, economic value, efficiency, and sustainability. These topics, not coincidentally, directly address the four guiding principles for New York's taxi system identified by the Taxi & Limousine Commission and the Design Trust. It's worth restating those principles here:

New York City's taxi system should offer taxi services that are safe, comfortable, and easy to use for all passengers and drivers.

New York City's taxi system should provide a good economic value to passengers and service providers.

New York City's taxi system should efficiently match the supply of taxi services with passenger demand.

New York City's taxi system should contribute to the environmental sustainability of the city.

For the purposes of this publication, TLC's regulatory efforts should be understood in terms of achieving these four principles—not a simple process. TLC must have a comprehensive understanding of each of these areas as they relate to the taxi system; develop strategies for meeting the four goals; locate resources to enact those strategies; and identify measurable indicators for monitoring progress, registering success, and identifying new strategies for improvement.

The Background & Assessment sections below are intended to offer some insight into how usability, economic value, efficiency, and sustainability relate to New York's taxi system. In addition, each of the four topical sections put forward possible strategies for improvement. These strategies, which could be implemented individually or as a group, have two sources; they are based on industry best practices, drawn from the authors' knowledge of transportation practices in New York City and elsewhere, and on an analysis of the particular qualities of New York's current taxi system, as revealed by interviews, user surveys, data review, and the authors' personal experiences.

Note again that this book is focused on the efforts of the New York City Taxi & Limousine Commission. Some interesting topics are not within TLC's jurisdiction (State and Federal environmental policies, auto-industry practices, urban planning, etc.), and some important aspects of the taxi system are fixed or unchangeable (New York City geography, weather). Traffic management, public-realm enhancements, vehicle-design considerations, and other issues are only addressed in as much as the TLC has an obvious current or potential role to play in bringing about improvements.

When resources to enact any suggested strategies are immediately evident, they are noted, but in many cases resource identification is beyond the scope of this publication. It should also be understood that TLC resources vary in connection with each of the four principles. TLC can take concrete action to meet its strategic goals where they have control of appropriate monies, time, staff, tools, infrastructure, expertise, political will, etc.

INDICATORS

It is vital to have a robust set of baseline data to accurately set achievable goals for improvement, plan and implement strategies to meet those goals, and monitor and judge the impact and effectiveness of improvements. Ideally, this data should also be broken down by industry sub-segments, such as fleet, long-term lease, owner-driver, etc. The following list, which includes many indicators already tracked by the TLC, provides a potential set of **data points** that the TLC could collect and analyze in relation to new initiatives:

Usability

- Taxi compliments and complaints to 311 and TLC, by category
- Passenger satisfaction, via tip income
- Driver and traffic citations, by category
- Taxi-related crimes
- New drivers per month/year
- Drivers not renewing license by month/year
- Driver geographic knowledge, per random test
- Driver English proficiency, per random test
- Frequency of driver physical assistance to passengers, per staged test
- Rate of driver refusal of passenger requests, per staged test
- Vehicle cleanliness, damage, and inspection failures
- Percentage of taxis offering multiple payment methods

Economic Value

- Average medallion sales price (individual and fleet)
- Lease rates by shift and by week
- Number of owners by type (owner-driver, fleet operator, etc.)
- Number of drivers by type (owner-driver, long-term lease, etc.)
- Average driver earnings per shift/week/month/year
- Average driver expenses per shift/week/month/year
- Average medallion owner earnings per shift/week/month/year
- Average medallion owner expenses per shift/week/month/year
- Average vehicle expenses per shift/week/month/year
- Average overall fare earnings per trip, per hour, per mile
- Average fare earnings for specific start/end points, per trip, per hour, per mile

Efficiency

- Most common trip origins and destinations
- Average wait times to get a yellow cab at select locations, at morning and evening peak during various seasons
- Occupied miles, by fleet and by vehicle average, by hour, day, week, month, and year
- Occupied minutes, by fleet and by vehicle average, by hour, day, week, month, and year
- Total miles driven, by fleet and by vehicle average, by hour, day, week, month, and year
- Total minutes driven, by fleet and by vehicle average, by hour, day, week, month, and year
- Average number of passengers per trip, per month and year
- Locations where wait times are shortest and longest, overall
- Times of day when wait times are shortest and longest, overall

- Locations, by times of day, where wait times are shortest and longest
- Average cab speed in Manhattan, on streets and avenues, per hour
- Average high/low cab speed in Manhattan, on streets and avenues, per hour

Sustainability

- Average greenhouse-gas emissions and criteria pollutant emissions (CO2, CO, VOCs NOx, PM10, PM2.5 etc.) for the entire fleet, per mile, per occupied mile, and per trip
- Average fuel consumption for the entire fleet, per mile, per occupied mile, and per trip
- Average greenhouse-gas emissions (CO2, NOx, PM10, etc.) and criteria pollutants for each approved taxi vehicle model, per mile, per occupied mile, and per trip
- Average fuel consumption for each approved taxi vehicle model, per mile, per occupied mile, and per trip
- Taxi share of daily/annual trips in New York City
- Internal air quality, after nine-hour shift, per vehicle model, in summer and winter
- Vehicle life-cycle environmental impacts (such as non-recyclable waste generated by used tires, vehicle bodies, etc.), per accepted measurement matrix

While the list above provides a good starting point for collecting baseline data about the taxi system, it must be understood as preliminary. As the TLC develops new strategies to improve economic value, the agency should be prepared to revise any list of data points to better monitor progress and to identify opportunities for further improvements. Further, the advent of electronic trip sheets will provide a new wealth of information that may suggest other valuable indicators. Monitoring should be undertaken on at least an annual basis. Most important, TLC should make all collected data publicly available.

Please also note that the strategies suggested in the sections that follow are often wholly dependent on the implementation of an ongoing data-collection process—for sensible initial implementation, for monitoring, and for ongoing revision and improvement.

USER OPINION

In addition to the specific data points discussed above, TLC strategies would be productively informed by an ongoing process to understand the opinions of system users and stakeholders. Important actors in the taxi system could be polled as to their experience and perception of various aspects of usability, economic value, efficiency, and sustainability. The appropriate method for this polling might be surveys, focus groups, or another mechanism. Topics for such open-ended research might include:

- How does driver income correlate to job satisfaction?
- How many hours/shifts per week/month/year do drivers work?
- What is the social and educational background of drivers?
- Why do drivers choose to drive?
- What industries do drivers leave to enter the taxi industry?
- How long do drivers stay in the taxi industry?

- What health issues do drivers have?
- To what industries do drivers go when leaving the taxi industry?
- Who are the owners?
- Why are owners in the taxi industry?
- How long have owners been in the industry?
- How does the medallion value effect the way owners work?
- What are owner business models? How do they vary? What do they have in common?
- Who is the passenger?
- Why do passengers take cabs?
- What do passengers like about cabs? And what would they like to see improved?
- How often do passengers take cabs?
- How much do passengers make?
- How much, as a percentage of their expenses, do passengers spend on cabs?

This research should be responsive to current and future initiatives, while also striving to build up a consistent body of opinion data over time for comparison purposes.

BENCHMARKS

As a further ambitious step, the TLC might choose to develop and publish a series of benchmarks related to each of the four principles. These benchmarks would be tied to specific indicators of usability, economic value, efficiency, and sustainability. If ongoing monitoring showed that taxi service levels were not meeting benchmarks, specific predetermined regulatory responses could be triggered.

Examples of such benchmarks might include, in the Usability category, “80 percent of all vehicles should pass tri-annual inspection on the first attempt; vehicles that fail inspection should incur penalties or suspension of service until they pass”; or, related to Economic Value, “Drivers should be able to work a nine-hour shift and earn, on average, an amount equivalent to the New York State minimum wage, when all driver expenses are taken into account; if necessary, the lease cap should be lowered or fares increased to meet this benchmark.” These sample benchmarks should be understood solely as examples of how such standards might be described and defined. Any actual benchmarking efforts must be determined only after a thorough review of baseline data and sufficient time to establish the efficacy of any improvement strategies.

USABILITY

New York's medallion taxicabs are more than a means of transportation—they're also a ubiquitous and vital component of the city's public realm. As both a public service and a public space, taxis should be held to high standards of accessibility, comfort, safety, and convenience—what could be called usability.

The cab's iconic status makes taxi usability even more important. As a symbol of the city, yellow-cab services should capture some of the glamour and professionalism of New York—through appealing appointments, relevant technology, and excellent customer service. Interactions between drivers and passengers should epitomize the efficiency and no-nonsense charm that make New Yorkers famous the world over.

A truly usable New York City cab would also meet the physical and service requirements of both of its major user groups, passengers and drivers:

Passengers deserve courteous treatment and a point-to-point transportation service that is easy to use, comfortable, safe, and enjoyable.

Drivers should have a safe and comfortable working environment and be supported in providing top-quality transportation services to their customers.

The New York City Taxi & Limousine Commission's regulatory responsibilities properly include oversight of both the design of medallion-taxi vehicles and the services that drivers and vehicles provide. This section describes the users of the taxi system and their preferences relating to both vehicular and service issues. It then proposes opportunities for the TLC to strengthen its role as a passenger advocate and regulator of drivers, improving taxi usability for all.

BACKGROUND & ASSESSMENT

Cab usability can be described in terms of the driving and riding experiences of taxi drivers and riders. Therefore, before considering recommendations for improving taxi usability, it's important to understand who rides in yellow cabs, why they use cab services, what concerns they have about the system, and what areas for improvement hide in plain sight, outside the occasional user's scope. Finally, it's necessary to consider the viewpoint of the taxi's most knowledgeable users—the drivers who actually spend the greatest number of hours occupying the city's cabs.

WHO RIDES IN YELLOW CABS?

There are more than 170 million paid medallion-taxi trips each year, or approximately 470,000 per day. With an average of 1.4 passengers per trip, this represents approximately 240 million person-trips by taxi each year, a number that has remained relatively consistent since 1995 (Schaller, 2006). While this enormous number represents only 11 percent of the nearly 2.2 billion person trips on the MTA's subway and bus network in 2005, it ranks the New York City taxi industry as the seventh-largest transit system in the United States, when compared to usage figures compiled by the American Public Transportation Association (APTA, 2006, p.10). Research suggests that no single user group dominates, but certain groups are more likely to be found in the city's yellow cabs:

Mostly Manhattanites

According to journey-to-work data from the 2000 U.S. Census—one of the most comprehensive recent statistical surveys of taxi usage in the city—taxi commuters are overwhelmingly concentrated in Manhattan below 96th Street, with the greatest concentration on the Upper East Side (U.S. Census Bureau, 2004). This corresponds with TLC surveying from the late 1980s and early 1990s, which found that 71 percent of total taxi trips were taken by Manhattan residents, 10 percent by outer-borough residents, 5 percent by NYC suburban residents, and 14 percent by people who live outside the New York City metropolitan area.

Women

Based on the 2000 Census, 52 percent of taxi commuters are female, which means female workers are 7 percent more likely than their male counterparts to commute

by taxi. The Regional Travel-Household Interview Survey, prepared for the New York Metropolitan Transportation Council (NYMTC), shows that women account for almost 60 percent of all taxi rides (Parsons Brinckerhoff, 2000).

The Rich…But Not Exclusively

According to the 2000 Census, taxi commuters have an average salary of more than $85,000, more than twice the average salary for all NYC workers (U.S. Census Bureau, 2004). More nuanced data from NYMTC's Regional Travel-Household Interview Survey shows that roughly a quarter of taxi riders, both commuters and non-commuters, earn less than $25,000 per year and another quarter earn more than $150,000 per year. Of all modes represented in this travel survey, only yellow medallion taxis have ridership shares of more than 20 percent at both ends of the income spectrum (Parsons Brinckerhoff, 2000).

Short-Trip Takers

Those who commute by taxi report the shortest commuting times of any New Yorkers, with an average of twenty minutes compared to thirty-six minutes. This figure likely reflects a combination of proximity to work (since many taxi users live in Manhattan near the central business districts) and faster total-trip times in taxis compared with buses, walking, and in some instances, subways.

Super Users

Finally, a very small number of daily commuters account for a disproportionate number of taxi rides. Based on 2000 Census data, 1.6 percent of the city's labor force, or 53,600 people, use taxis and other for-hire vehicles as their primary means of commuting to work on a daily basis. Although 53,600 people may not sound like a lot, given that commuting is a twice-a-workday event, these taxi commuters potentially generate in excess of 25 million trips per year (at 235 workdays per year, times twice per day), which is more than 10 percent of all taxicab usage.

HOW DO PEOPLE USE TAXIS?

The emerging picture is that the prototypical taxi rider is a female Manhattan resident, with above-average income, who is mostly using the taxi for short trips, including trips to work. But what about other riders? Taxis are also used by business people going to meetings during the work day, tourists and day-trippers getting to New York's widespread attractions, travelers riding to and from the airport, and New Yorkers at leisure going to and from restaurants, clubs, shopping, etc.

To better understand what motivates users, in September 2006 the Design Trust for Public Space conducted an online survey of taxi passengers, which attracted more than five hundred respondents. (See the Appendix for complete results of the Design Trust for Public Space Taxi 07 Passenger Survey.) Survey participants provided demographic and usage information, as well as responses to open-ended questions. In addition, Design Trust fellows conducted interviews with several dozen passengers, drivers, and other members of the taxi industry. (See the Acknowledgments section for a complete list of interview subjects.)

While the survey was neither large nor widely distributed enough to be considered comprehensive, in terms of gender, income, and place of residence, the demographics of the Design Trust sample population generally corresponded to those of

taxi commuters in the 2000 Census. [2] This suggests that the Design Trust survey sample is a reasonable representation of current taxi passengers, as opposed to the general population of the city. Interestingly, despite expected demographic variety among survey respondents, most survey responses did not vary significantly when analyzed by gender, income, or home borough. Rather, respondents' taxi usage reflected common criteria across user groups.

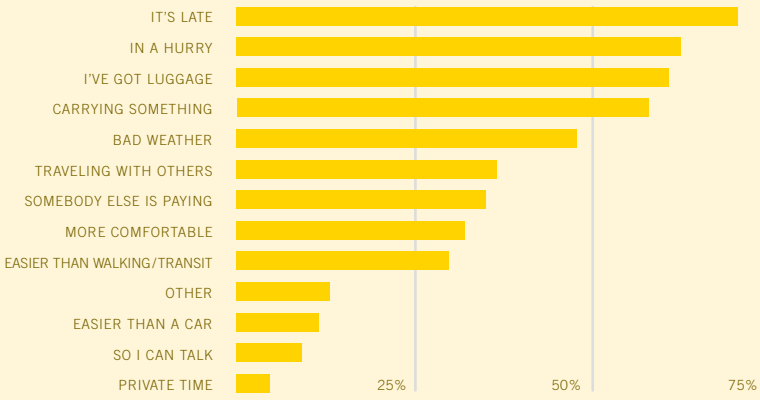
2 For example, in terms of gender, 51 percent of the Design Trust survey respondents were female, while 52 percent of taxi users in the 2000 Census were female. Income distribution was also comparable; Design Trust respondents reported an average personal yearly income of $75,000, while the 2000 Census reported the average taxi commuter's income as $82,000. Even though this is a high average, both surveys show a wide distribution of income, with at least 25 percent under $50,000 and 25 percent over $100,000. The Design Trust respondents were mainly residents of Manhattan and Brooklyn, which corresponds with the population most likely to use taxis.

Taxi Usage Is Circumstantial

Most taxi users don't use cabs habitually, for all their transportation needs. Rather, taxi use is situational, a conscious passenger decision based on circumstances that make other forms of mass transit less appealing. Respondents reported the most common reasons they take cabs are "It's late," "I'm in a hurry," and "I've got luggage."

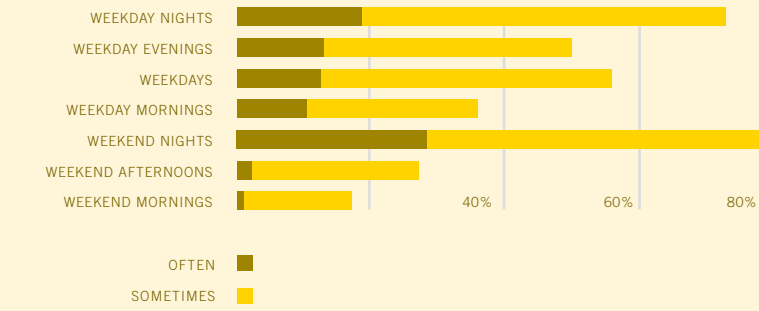
The most common motivation for taking a cab, "It's late," corresponds with data on the most common times people take taxis. Respondents take taxis most often on weekday nights and weekend nights. These are also the times respondents report having the most difficulty hailing cabs.

US1: Reasons People Take Cabs



Design Trust Taxi 07 Passenger Survey, 2006

US2: When Do You Take Taxis?



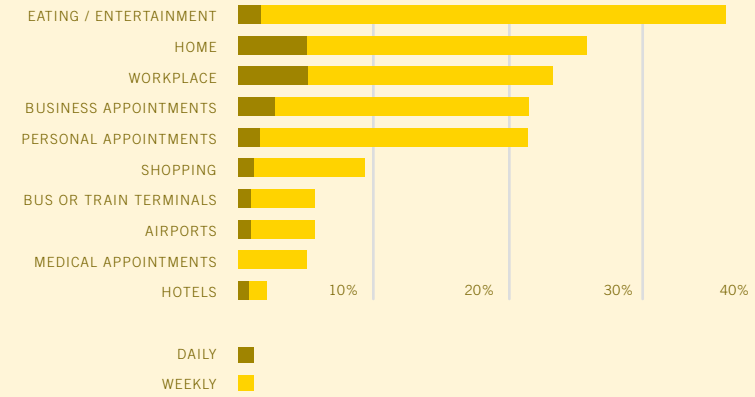
Design Trust Taxi 07 Passenger Survey, 2006

Taxi Usage Facilitates the Everyday

Taxi users most often take cabs to get to and from common activities and locations—home, the workplace, business appointments, and dining or entertainment. More than 65 percent of respondents agree that taxis help them live in the city without a car. On a daily or weekly basis, riders are most likely coming from dining

or entertainment, home, or the workplace; and riders are most frequently on their way to home, dining or entertainment, or business appointments. However, over 70 percent report also taking taxis to or from the airport at least a few times per year.

US3: Origins of Taxi Trips



Design Trust Taxi 07 Passenger Survey, 2006

Cost does affect people's tendency to take a cab—over 80 percent of survey respondents reported considering cost before hailing a taxi—but it doesn't keep people from using cabs for everyday comfort. Personal income had a greater effect on decisions to take taxis to and from business appointments, shopping, and work, while income had a lesser effect on decisions to take taxis to and from dining or entertainment, home, and personal appointments.

Taxi Usage is Shaped by Cab Availability

Residents of Manhattan were always significantly more likely to take taxis than residents of Brooklyn. In addition, residents of Brooklyn were 20 percent more likely to take taxis to home than from home. 3 Both findings confirm the obvious—that people are more likely to take a cab when a cab is available. In addition to being geographically determined, confidence about finding a cab also relates to familiarity with the city: All residents and commuters within the city seemed to feel they were better informed about where to get a taxi, than were non-residents and business commuters. The latter were more likely to wait in a taxi stand line at train and bus stations.

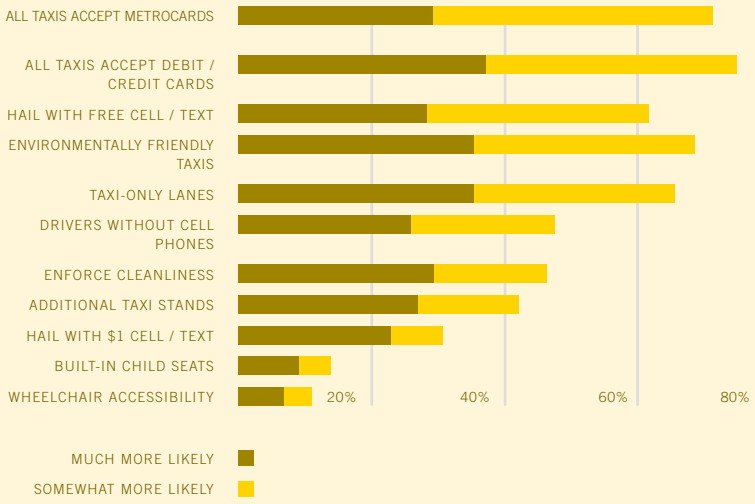
3 There were not enough responses to perform cross-tab analyses for residents outside of Manhattan and Brooklyn.

PASSENGERS' TOP PRIORITIES: EFFICIENCY AND SPEED

Given a list of systemic improvements and asked which would have the greatest impact on their decision to take cabs, respondents' top two selections related to non-cash payment options: 'all taxis accept debit/credit cards' and 'all taxis accept Metrocards.' Runners up included 'environmentally friendly taxis,' 'taxi-only lanes,' and 'hail with free cell call or text message.' Setting aside environmentally friendly taxis, four out of the five top responses relate to improving the speed and efficiency of taxi service.

In the context of systemic improvements, passengers ranked a number of comfort, safety, and service options—including 'drivers not using cell phones' and 'better enforcement of cleanliness standards'—lower than expected.

US4: Improvements That Would Increase Likelihood of Using a Cab



Design Trust Taxi 07 Passenger Survey, 2006

PASSENGERS' TOP INTEREST: CUSTOMER SERVICE

Although the survey identified efficiency improvements as a top passenger priority, open-ended survey and interview questions elicited a very different primary interest: customer service was the overwhelming first topic for passenger comment. In fact, when asked their opinion of New York's taxi system, most interview subjects described their experiences with taxi drivers, pleasant and unpleasant, rather than any aspect of the payment system or vehicle design. Among customer-service concerns, four top issues emerged:

> "I'VE HAD DEEP, PHILOSOPHICAL CONVERSATIONS ABOUT POLITICS, FAMILY, AND LOVE... THE CONNECTION BETWEEN TWO STRANGERS, DRIVER AND PASSENGER, IS ONE OF THE THINGS THAT MAKES NYC SUCH A GREAT PLACE TO CALL HOME."
> TAXI PASSENGER, DESIGN TRUST SURVEY

Driver Courtesy During Loading and Unloading

Passengers expect that drivers should provide time to load and unload with comfort and dignity. Riders welcome assistance—especially when traveling with luggage, packages, children, or when dealing with mobility constraints—but their primary request is for patience and courtesy.

Although loading and unloading issues affect a broad range of users, from parents with small children to the elderly, passengers with disabilities are particularly affected.

"THEY WATCH YOU STRUGGLE WITH THE BABY AND TRYING TO PUT STUFF IN THE TRUNK; AT THE SAME TIME, THEY'RE IMPATIENT THAT YOU'RE NOT QUICK ENOUGH."
TAXI PASSENGER, DESIGN TRUST SURVEY

Driver Clarity Regarding Destination and Route
Passengers strongly prefer drivers who are familiar with the city, including significant local landmarks—transit hubs, cultural institutions, hospitals, etc.—and major outer-borough arteries. Riders also feel more comfortable when drivers clearly acknowledge that they've heard the passenger's destination and state their intended route. This step can be particularly crucial for passengers with visual disabilities, who may appreciate other interim updates on their location as an assurance that they're following the most direct route to their destination.

Steady Driving at Average Speed
Passengers expect drivers to follow traffic rules, maintain road etiquette, and not indulge in unnecessary braking, lane changing, or other risk-taking behavior. Passengers appreciate it if a driver keeps to a steady speed, matching or just exceeding the pace of surrounding traffic. Going too fast is frightening and unacceptable, but driving that is slower than traffic conditions require can be frustrating and defeats the purpose of taking a taxi.

Tipping As a Courtesy, Not a Requirement
Passengers prefer that tipping be understood as a reward for good service, not an obligatory add-on to the metered fare. Significant tension arises when passengers feel that they have provided a tip that is appropriate—perhaps reduced to recognize a service failing—and drivers feel short-changed.

It should be noted that passengers seldom acknowledge common sources of driver frustration—outer-borough trips, for example, which reduce the likelihood of drivers finding a return fare, or service requests that put the driver at risk of getting a ticket.

OFF THE RADAR: WHAT PASSENGERS DON'T KNOW

Many riders recognize that the cab riding experience has improved, but some may not know of the many improvements and reforms that have been instituted that effect safety and customer service. Just as other cities recognize NYC's TLC for its leadership role in reforms and initiatives – such as drivers earning a living wage, crimes against drivers going down significantly, medallion prices soaring, and reduction in motor vehicle accidents involving taxicabs – the riding public should also be aware of these changes.

Interviews and survey responses reveal that important aspects of the taxi system are outside the common knowledge of most taxi riders. The following points are key to improving the cab's usability, but systemic improvements will be difficult

to achieve if they remain off passengers' radar. Attempts to improve taxi usability must educate passengers about the following:

The Driver is Part of a System

Taxi passengers see the driver as the human face of the taxi system. Riders are largely unaware of the role that the TLC, medallion owners, fleets, and other members of the taxi industry play in taxi service. Consequently, they are not familiar with the financial and service constraints experienced by drivers.

Changes in the Taxi System Can Affect Passengers

Riders may be aware of small changes in New York's taxi vehicles over recent years—improved passenger air conditioning, for example—but many may not perceive the vehicle as a designed object that could be reconfigured to specifically address the requirements of taxi service. Passengers are not familiar with the frequency of vehicle turnover in the yellow-cab fleet, the power of the TLC to mandate vehicular and systemic change, or the economics of medallion ownership that might finance significant improvements. Nor do they explicitly recognize the degree to which systemic elements, from streetscape design to driver ownership models, affect their passenger experience.

New Technologies Could Significantly Alter the Taxi Experience

Just as networked communications technologies are becoming ubiquitous in other aspects of contemporary life, wireless data delivery and geographic positioning are now emerging in cabs, too. Seatback monitors, credit-card readers, GPS-enabled electronic maps, electronic trip sheets, and text-messaging capabilities have been conceived, initiated, implemented and approved by the TLC and are being installed in the current fleet (see page 88). Beyond these forthcoming initiatives, GPS location of passenger demand, mobile hailing, and Internet access are related technologies that could also be considered for New York City's cabs.

The impact of these services may be significant. These technologies are precursors of a taxi system that knows where passengers are, what they need, where they want to go, and how much it costs to get there. However, passenger awareness of the possibilities provided by these technologies is currently limited, meaning that riders have little ability to lobby for the particular technology applications that they would find most valuable. (Lack of information in the driver community can also be an impediment to the embrace of new technologies, as drivers may be unable or unwilling to explain the services to riders.)

"IF YOU WORK LATE AT NIGHT, YOU LOOK AT THE PEOPLE. IF THEY ARE DRUNK, I MIGHT NOT PICK THEM UP. YOU DON'T WANT THEM TO THROW UP IN THE CAB."
YELLOW-CAB DRIVER

DRIVER PRIORITIES

No discussion of taxicab usability would be complete without reference to the user requirements of drivers. Cab drivers, after all, are not only service providers, but also the most intensive users of the taxi system, spending up to a dozen hours in the vehicle and navigating relationships with all members of the cab system, from passengers to medallion owners to the New York City Taxi & Limousine Commission. Driver priorities include the following:

Customers That Provide Reliable Fare Income

Drivers' primary user requirement is to make sufficient income from a given shift to cover expenses and generate a profit. For this reason, drivers may prefer customers who will provide a reliable fare with no income-reducing aftereffects. Drivers may be reluctant to pick up passengers who might dirty the car, who have outer-borough destinations (increasing the likelihood of an empty, unpaid return trip to Manhattan), or who may simply refuse to pay. What passengers perceive as unreasonable refusal may reflect a driver's attempt to protect his economic self-interest.

"There is a need to increase the lot size at LaGuardia. The lot is always full, and if you are idling outside of the lot waiting for a space to open up, you can get a summons. But there is nowhere to go!"
taxi driver, Taxi Workers Alliance

Increased Administrative Efficiency

Drivers would like interactions with the TLC to be pleasant and efficient. Not surprisingly, they would also prefer that TLC regulations and enforcement were designed to minimize driver inconvenience and loss of income. Some owner-drivers, whose vehicles are usually on the road for fewer hours, suggest that vehicle inspections—which sometimes take forty-five minutes to an hour, depending on vehicle condition—could be required on a miles-driven basis, rather than a regular three-times-a-year schedule. And drivers of all stripes would like to see speedier turn-around at licensing facilities.

Reduced Traffic Violations

Drivers express concerns over the frequency and cost of on-street summons. When a driver does receive a summons, the driver may have to pay the cost of the summons and may have to attend a hearing where they spend time they may otherwise have been able to spend working. Taxi drivers also receive violation points on their driver's licenses according to a stricter penalty rate than the one applied to 'civilian' drivers.

Drivers recognize that enforcement is necessary, but would prefer that greater accommodations be made for taxis on city streets. "Cabs should be allowed to ride in bus lanes when they have passengers. They are just like the buses [in that they offer transit services], and they should be shown a little respect," noted one driver. While the merits of that specific proposal could be debated, it's worth noting driver interest in traffic regulations that recognize their special transit role.

Enhanced Driver Accommodations

Drivers also express interest in greater accommodation of their physical and personal needs, ranging from more ergonomic seating to better access to restroom facilities. Finding a free spot to park temporarily can be a daunting task, so many drivers hardly step out of their vehicles for the length of a twelve-hour shift. Some taxi facilities, such as the Central Taxi Hold lot at JFK Airport, have begun to incorporate driver services, but the possibility exists for expansion. Drivers also note that existing driver accommodations, such as relief stands—where drivers can park, fee free, on city streets for periods up to an hour—could be made more valuable through increased enforcement of rules prohibiting non-cab vehicles from parking in current relief areas.

SIDEBAR: NEW TAXICAB SERVICES

The TLC has a program of four technology initiatives underway, collectively known as the Medallion Taxicab Service Technology Enhancements. The TLC's objectives are to enhance communication with drivers, improve the quality of service delivered to passengers, remove the burden of driver record-keeping, and increase the accuracy of planning by collecting digital data.

SMS, or short messaging service, will be displayed on a dash-mounted display, so the TLC can broadcast traffic information, emergency instructions, and lost-property alerts to all yellow-cab drivers. Drivers will be able to reply with preformatted messages by pressing a single button, to keep their eyes on the road.

A passenger information monitor, or PIM, mounted on the passenger's side of the partition, will display commercial and entertainment content. The PIM will also display TLC information, replacing the current partition stickers, and a real-time location-based map.

Payment by credit/debit cards will be possible though a point-of-sale terminal in the PIM that's integrated with the fare meter. This card-swipe and keypad interface will allow passengers to pay drivers with debit or credit cards.

Electronic trip sheets will relieve drivers of the hassle of logging trips by hand. Trip data, including each trip's start and end location and time, can be captured and submitted automatically to the TLC, where it will be archived efficiently and aggregated for planning purposes.

STRATEGIES

New York City's taxi system should offer taxi services that are safe, comfortable, and easy to use for all passengers and drivers. As the regulator of New York City taxi services, the TLC may be able to increase user convenience and enjoyment by pursuing the following strategies, in concert with the data-collection and monitoring processes described above in the introduction to this part of the publication.

SUPPORT DRIVER CUSTOMER SERVICE

The TLC may further encourage excellent customer service by strengthening its relationship with the driver community, providing additional service training (beyond the initial driver training and continuing education currently offered), offering incentives for demonstrated quality service, and supporting driver ownership.

Bolster Customer-Service Training

Driver and passenger are bound together in the limited space and duration of the ride. This time can take the form of a positive interaction, a neutral silence, or an unpleasant enforced intimacy. The TLC's existing driver-education requirements currently include an extensive customer service curriculum—both as part of initial pre-licensure training and as part of a continuing education in-service training course. However, it might be worthwhile to explore placing additional emphasis on the following topics which address issues identified by passengers as significant to their enjoyment of the ride: driver courtesy during loading and unloading; driver clarity regarding destination and route; steady driving at average speed; and tipping as a courtesy, not a requirement. Taking a fresh and ongoing look at this program to see how it could be improved may increase the experience for both the passenger and driver.

TLC could also look outside the city and the taxi industry for examples of best practices. For example, Vancouver's TaxiHost program—a voluntary driver-education program—has won numerous awards. [4] Companies such as JetBlue and Zipcar have business models that focus on excellent provision of customer service; TLC could assess these and other service leaders for ideas applicable to the taxi market. TLC might also find it valuable to conduct more extensive research to explore passenger expectations. The results of those studies could be used proactively to develop driver-training materials.

4 For more information on Vancouver's program, see: http://www.jibc.ca

Strengthen Relationship with the Driver Community

The TLC has provided very effective economic support to the driver community, through the imposition of lease caps and the wait-time fare adjustment as just two examples. Efforts to strengthen the TLC's relationship with drivers as users of the system could receive similar staff and regulatory attention. Intensified service by the TLC might provide a stronger platform for requiring quality customer service from drivers. Areas for exploration include:

- **Rules Review:** In early 2007, the TLC issued an RFP for an outside contractor to perform an assessment of existing TLC rules. The goal is to review TLC rules, making them clear, concise, unified and user-friendly. Currently, drivers report receiving tickets for such minor infractions as leaving a receipt sticking out of the meter.
- **Driver-Centered Outreach:** The TLC has conducted extensive outreach on the Technology program, including communicating directly with drivers. Additional ongoing efforts by the Office of Constituent Affairs to address driver questions in advance of new passenger services, technologies, or vehicle mandates. Technology enhancements, such as credit-card processing and the passenger information monitor (PIM), should be understood by drivers, so that drivers see the value—and true impact—of new mandates and hopefully act as ambassadors for the services with passengers. 5
- **Access to Facilities:** Provision of additional driver relief stands, including perhaps the design or franchising of new facilities that incorporate food stalls, prayer space, restrooms, and telephones. As a first step, better enforcement of rules prohibiting non-cab vehicles from parking in current relief areas.

These recommendations are not meant to be comprehensive; see the Economic Value and Efficiency sections, below, for further suggestions on supporting the driver community through leasehold medallions, 'Ambassador' licenses, and driver incentives for outer-borough trips. Staff in various offices within the TLC have extensive driver contact and are also well positioned to identify opportunities for improving driver services. Additionally, the TLC has established various industry advisory boards that serve as communication mechanisms between the TLC and constituents. The TLC should continue their efforts to make these groups substantive contributors to ongoing policy discussions.

5 Driver concerns about implementation of credit-card processing, text messaging, and electronic trip sheets provide a useful test case when considering driver outreach efforts. As might be expected, economic impacts are a prime concern, but user experience is also an issue. According to industry groups, drivers who own their vehicles worried about the cost of installing new equipment. Drivers as a group questioned the following: the value of GPS as a navigational tool and its privacy ramifications; the impact of an audible PIM on driver/passenger communications; the cost of the credit-card transaction surcharge and the impact of cashless payment on tips; and the cost and downtime associated with repairing a PIM-linked meter. Future outreach efforts could specifically address the economic and usability aspects of new services from a driver's point of view and proactively outline TLC plans to track impacts on driver income and user experience as part of ongoing benchmarking efforts.

"I HAD A GREAT TAXI RIDE WITH A PERSONABLE DRIVER. I WANTED TO TIP HIM GENEROUSLY, BUT I FORGOT MY PURSE. THE DRIVER WAS VERY UNDERSTANDING AND EVEN OFFERED TO GIVE ME MONEY TO MAKE IT HOME."
TAXI PASSENGER, DESIGN TRUST SURVEY

Offer Incentives for Good Drivers

Currently, passengers can use 311 to report positive taxi experiences, and TLC holds an annual driver recognition ceremony where the agency honors those drivers who receive compliments and provide outstanding service. New technologies, such as interactive seatback screens, could soon offer riders the opportunity to submit a real-time service assessment. Drivers would be able to track passenger perception of their performance, and drivers with particularly high service evaluations could be eligible for reductions in licensing fees, for example. Other appropriate incentives, such as 'fast-track' service at TLC facilities, should also be explored.

Support Driver Ownership

Although the TLC has made an effort to support driver ownership through policies such as sales of independent medallions and vehicle retirement extensions, the TLC should continue to actively search for new ways to support driver ownership. In interviews with yellow-cab drivers, those who own their own medallion and vehicle report feeling pride in their work and look upon driving as a career; the same is true of drivers of livery cabs who own their own cars. In addition to the improved customer service that can be inferred from greater professional satisfaction, owner-driver cabs are also safer; they have 43 percent fewer crashes per mile drive, compared to vehicles that are leased by the shift (Schaller, 2004). Increasing driver ownership could be considered a customer-service improvement; see the Economic Value and Efficiency sections, below, for specific recommendations regarding mechanisms for encouraging driver investment in the system.

HELP PASSENGERS BECOME EXPERT USERS

The TLC has an admirable focus on protecting riders by explaining their rights and responsibilities. Service announcements regarding seatbelt usage and warnings to watch for bicyclists are useful and necessary initiatives. As passenger information monitors (PIMs) are installed, the delivery of information will improve. The PIM will replace the stickers that currently dot the partition and seatback. Communications will appear on a single screen, making existing announcements more streamlined and legible. The PIM also provides an opportunity to offer information that could help passengers be more expert users of the taxi system.

Inform Riders of Taxi and Traffic Rules

It would be helpful if more passengers recognized that the driver is bound by TLC and traffic regulations. Rules against stopping in bike lanes, for example, are not familiar to most riders. Lacking this specialized knowledge, passengers often unwittingly put drivers in the position of either refusing a rider request or breaking the law. If informed, conscientious passengers would be much more likely to respect constraints on driver behavior. For example, most riders do not expect drivers to run red lights for their convenience. The TLC should consider informing passengers of taxi and traffic regulations that affect a driver's ability to respond to requests. An informational campaign, conceived and executed by public-relations professionals, would be the most effective way of reaching passengers.

Other areas for increased passenger awareness include distinctions between a yellow cab, a livery vehicle, and a black car or limousine, specifically relating to street-hail and other service and fee differences. More obvious ways of distinguishing TLC-licensed vehicles from illegal car services might also be helpful.

"PEOPLE GET INTO CABS AND JUST SHOUT OUT THE ADDRESS AT THE GUY... AND THE DRIVER BARELY ACKNOWLEDGES IT WITH A GRUNT. IF THE DRIVER DIDN'T HEAR, AND THEN IF THE PASSENGER IS NOT CLEAR, IT CAN LEAD TO A WHOLE LOT OF PROBLEMS."
TAXI PASSENGER, DESIGN TRUST SURVEY

Sensitize Riders to Driver Interaction

Passengers could also be more mindful of the social aspects of the driver-passenger interaction. Some conduct is simple common sense: Just as passengers prefer for drivers to know the way, drivers prefer attentive passengers. Drivers report that passengers using mobile phones often fail to respond to driver questions (such as "Which side of the street do you prefer to be dropped off?"), and then become frustrated when drivers cannot accommodate their preferences at the last minute. More subtle social nuances may be completely lost on passengers: while it may be unreasonable, some drivers prefer that women not ride in the front passenger seat, as they wish to avoid any appearance (or accusation) of inappropriate behavior.

TLC could explore options for customer-service announcements that address these and other interactive aspects of the trip, perhaps through messages from real drivers displayed as video clips on PIMs. TLC might consider other opportunities to remind passengers of the individual humanity of drivers, such as introducing more detailed driver-identification materials.

Photos and biographical material describing how long the driver has been operating a cab, for example, might be displayed on the passenger monitor. These materials should be developed with input from drivers, coordinated with other public-relations campaigns, and designed to reflect the TLC's consistent, friendly, informative tone.

ENSURE A SAFE, COMFORTABLE, AND ACCESSIBLE RIDE

As a publicly regulated transportation service, the taxi system should provide a safe ride that is easy to access and even enjoyable—for all passengers. By implementing licensing and vehicle standards, the TLC has done an excellent job of providing safe service. Some opportunities do exist, however, to make the taxi system easier to access and more enjoyable.

Accessibility is a broad term that can include both availability (see the Efficiency section, below, on matching cab supply to passenger demand) and physical access and user comfort. How enjoyable a cab ride is depends in part on sufficient

accessibility, but also on more intangible qualities, such as the intuitive ease of use and pleasure provided by good design.

Implement an Accessibility Strategy That Improves Access for All Passengers

Just as vehicles should increasingly take environmental sustainability into account, all taxis and taxi services should better accommodate different types of riders, including children, the elderly, people with disabilities, and even the left-handed. 'Inclusive' or 'universal design' describes an approach that strives to make environments and objects usable by all people, without the need for specialized adaptation. 6

6 See the Center for Universal Design, http://www.design.ncsu.edu/cud/, and the Helen Hamlyn Research Center's annual conferences on inclusive design, http://www.hhrc.rca.ac.uk/kt/include/2007, among many other resources.

Taking an inclusive approach to taxi design makes modernizing the vehicle that much more urgent, feasible, and economically justifiable. For example, the lowered floor plates, widened door frames, and interior space requirements demanded by mobility devices are also very helpful for the elderly, injured, and large-framed. The passenger information monitor and other, symbol-based graphics could be valuable tools both for the deaf and for non-English speakers. An audio version of the standard information provided on a monitor would assist the visually impaired. Future cost-benefit analyses of potential vehicle requirements could consider this inclusive approach, and vehicle manufacturers and taxi industry leaders should be encouraged to embrace inclusive principles.

Consider the Specific Requirements of Users with Disabilities

While an inclusive approach to taxi design is recommended, users with disabilities also raise specific, pressing needs relating to taxi service, particularly given their limited access to some of New York's mass transit system. By establishing, monitoring, and publishing indicators for accessible taxi services, TLC will have a strong and transparent basis for a phased approach to providing accessible taxi services, focusing first on guaranteeing minimum standards for service, then on implementing more stringent vehicle requirements.

"If you can't get in, it doesn't matter how many thousands of cabs there are—you're just locked out on the sidewalk."
Jean Ryan, Disabled in Action

In January 2007, TLC staff proposed adoption of a GPS-enabled central dispatch service for accessible vehicles; design of such a system is currently under discussion. 7 As part of the development and launch of that service, TLC could perform ongoing testing of response times for requests for accessible vehicles. Failure to meet minimum service standards could trigger requirements for additional accessible vehicles, for example. 8

7 The TLC's electronic-dispatch proposal can be viewed at: http://www.nyc.gov/html/tlc/downloads/pdf/presentation_accessible_dispatch.pdf

8 The necessary level of vehicle accessibility is a matter of some debate: Manufacturers such as Toyota and GM advocate a solution that addresses the majority of people with disabilities who have sufficient mobility to transfer to a lowered car seat (approximately 60 to 70 percent) rather than the minority who require fully wheelchair-accessible transportation. Toyota Mobility is the leader in less-able vehicles sales and worked with the Japanese government to develop a strategy for the rapidly aging population and the less able. In Japan, all taxis are capable of transporting the 60 to 70 percent of people identified above, with specially modified minivans with ramps for those requiring full wheelchair accessibility.

On a longer-term basis, the TLC should continue to work to achieve an ever more accessible yellow-cab vehicle, with an eventual target of complete wheelchair accessibility. This is the preferred solution of many in the disabled community, some of whom also advocate for the adoption of a purpose-built accessible taxi vehicle. A final phase of implementation might focus on a fully accessible for-hire vehicle fleet, although that would require a significantly longer time horizon.

ENHANCE USABILITY THROUGH DESIGN AND COMMUNICATIONS

With the passenger information monitor (PIM), electronic trip sheets, text-messaging capabilities, and ubiquitous credit-card payment, the TLC is making great strides towards supporting riders' and drivers' ease of use through vehicle and technology enhancements. Continued focus on standardizing processes for TLC communications and taxi service design will enhance future requirements efforts—and overall usability.

"[I'D LIKE] AN ELECTRONIC MAP TO SHOW THE FASTEST WAY TO GET TO MY DESTINATION AND TO ENSURE THAT I WAS NOT BEING TAKEN THE LONG WAY."

TAXI PASSENGER, DESIGN TRUST SURVEY

Implement a Comprehensive Service-Design Process

The TLC can continue to create benefits for users by approaching new requirements initiatives as a service-procurement process, as compared to a product-procurement process. To support future requirements efforts and, above all, to ensure high quality and well-received outcomes, the TLC could apply a formal design methodology to its innovative projects—a recognized five-step process, based on International Organization for Standardization (ISO) principles, to define, design, develop, deploy, and document its new initiatives. 9

This methodology—identifying users and setting success criteria; making phased, collaborative decisions; and documenting the outcome critically and iteratively—allows solutions to emerge that meet the project goals and serve the identified audience (figure US5).

US5: Elements of Design Process

	Team's Tasks	Deliverables and Outcomees
Define	Study precedents, assess and rate current state, prioritize goals, and identify requirements. Write next year's headlines to envision success from a user's perspective. Recognize what works and pledge to augment or protect it. Identify potential obstacles / risks.	A clear scope of objectives, informed by research.
Design	Pick providers to match objectives. Involve people with collaborative experience. Specify that they deliver relevant services, with meaningful content, by appropriate means to identifiable audiences. Test concepts with end users.	A set of options that users can validate and refine before further development.
Develop	Schedule, test, and reiterate. Design the parts of a service that aren't technical alongside those that are; that way hardware and software work together. List items for later iteration that can't be achieved in round one.	A prototype that still reflects the objectives and user requirements, and now also the full details for production (number of screens, range of content, materials required).
Deploy	Pilot and launch with a public education campaign.	A strategic package that tells a relevant story to users and delivers identifiable benefits to them.
Document	Track uptake and success over time. Measure with same indices against original success criteria. Capture new requirements for subsequent iterations.	A resource for the Define stage of the next phase of this project, or for other projects; a way to identify patterns to suggest further innovation and problems to overcome within the system.

9 The ISO 9000 standard, for a quality-management system in production environments, is outlined at http://www.iso.ch/iso/en/iso9000-14000/understand/inbrief.html and provides a good framework for this approach. Also see http://www.lean.org/WhoWeAre/NewsArticleDocuments/Lean%20Consumption.pdf, in which James P Womack and Daniel T. Jones outline six 'Principles of Lean Consumption', first published in the March 2005 Harvard Business Review, that could apply equally to customers or taxi users.

SIDEBAR: ACCESSIBLE TAXI SERVICE IN NEW YORK CITY

The Americans with Disabilites Act of 1990 requires all transportation services to provide "equivalent service" for persons with disabilities. However, the ADA defines accessibility requirements only for vans and buses, not for passenger sedans. In New York City's case, this lack of Federal standards essentially exempts yellow cabs from accessibility standards.

The situation is exacerbated by New York City's lack of other accessible transit options. The subway system is far from optimized for passengers using wheelchairs or baby strollers, and while the bus fleet is improving, it pales in comparison to the entirely low-floor fleet in cities such as London, where passengers can often board with limited assistance from drivers or impatient glances from other customers.

Vehicles designed for easier access and a broader range of passenger types would reduce passenger reliance on the driver. New medallions for wheelchair-accessible vehicles provide improved access for all passengers, but advocacy groups like Taxis for All rightly point out that those medallions currently make up only a miniscule portion of the fleet: 81 vehicles out of 13,087, with 150 additional wheelchair-accessible medallions being auctioned off during the City's fiscal year 2008.

The New York City taxicab hail system is unique, and no other city faces the same challenges or opportunities as New York. In this context, TLC continues to take a leadership role in attempting to improve the accessibility of the fleet. In June 2006, new accessible taxicab specifications went into effect. Also, in recognition of the dearth of vehicles on the U.S. market that can be made both ADA-compliant and suitable for taxicab use, TLC has been working to find a fully wheelchair-accessible taxi by meeting with vehicle manufacturers and modifiers, accessible medallion owners, taxi drivers, and advocates for the disability community. As an interim solution, TLC staff presented a proposal at the January 2007 TLC Commission Meeting for an electronic-dispatch system that would offer wheelchair users on-demand or pre-arranged accessible taxi service.

In addition to following a standardized service-design process, it may sometimes be advantageous for the TLC to invite multidisciplinary vendor teams to respond to a Request for Proposals (RFP) for design or implementation of service improvements. The TLC could then call upon professionals with a range of appropriate skill sets—such as industrial designers, information architects, computer interface and graphic designers, usability experts, and copywriters—to complement those experienced in developing hardware and backend systems for cabs.

As with all municipal agencies, the TLC must manage any RFP using accepted New York City procurement procedures. The appropriate model for the multidisciplinary team proposed above may be the one used when the City takes on the design and construction of public spaces—projects that may require the services of architects, landscape architects, structural and civil engineers, lighting designers, and others.

Develop and Own a Communications Strategy

The New York City taxi is a powerful and globally recognized brand. In addition to utilizing a standards-based design process, changes to the appearance or usability of the taxi should be considered in terms of brand identity. Efforts should be made to develop a communications strategy that introduces any improvements into the public understanding of the taxi.

To that end, the TLC should launch any new service or vehicle enhancement with a publicity campaign. The goal is to communicate to the public the value of the TLC undertaking these efforts. Transport for London's "Cabwise" and "Safer At Night" campaigns are good examples of this. For each aspect of the campaign, TLC could identify the following:

US6: Taxi Technology: Developing a Communications System

In Choosing	Identify
The Audience	Who's it for? What is the benefit to them?
The Medium	Is the campaign in cabs, on other transport systems, or in the media? Is it distributed via print, web, radio, outdoor advertising, or word-of-mouth?
The Functionality	What defines the experience? Is it something to feel, use, listen to, watch, interact with, navigate to? Is it always on or sometimes asleep? Is it location-specific or not? Does it depend on time of day? Will it deliver content? Will the content be in real-time or asynchronous?
The Content	What's the story? Is it informative? Opinionated? What will you leave out? What's the tone for telling it? Who's telling it? How will it be maintained/updated? Is it interactive? How?
The Technology	What enables the experience? Does the technology need to be unbreakable? Washable or regularly updated? Private? Fast? Wireless? Low-tech? Permanent? Does it broker relationships? What kinds?

SIDEBAR: CONTENT–DELIVERY CASE STUDY: PASSENGER INFORMATION MONITOR (PIM)

The passenger information monitor (PIM) is a flat seatback screen used to deliver content and services. Content includes news, sports, and weather, TLC Public Service Announcements (PSAs), and a real-time map of the passenger's location. The PIM is also used to complete credit-card payments.

The first iterations of the PIM, due to be installed across the fleet by late 2007, were developed by four independently operated hardware vendors. As these systems mature and the technology becomes standard, future iterations will evolve. Based on analysis of the content and interface, five recommendations for future development emerge:

Position the PIM primarily as a non-commercial offering

The PIM should offer an experience that delivers more than a series of advertisements or cable channels. Instead, it should be a portal to relevant services, with a strong TLC brand, just as seatback entertainment in airlines incorporates the carrier's branding, safety films, and entertainment options.

Highlight passenger control

Many see the cab as an extension of their private space, and uncontrollable media can be seen as an invasion. The TLC has taken good steps to ensure that users can control the monitors' function, brightness, and volume. This functionality is primary: it is vital that passengers can immediately grasp that they have control over the PIM. Those controls should be ever-present on the screen and easily identifiable.

Create brief and memorable public announcements

Repetitive announcements, even important ones, can become tedious and ineffective. Instead, informational or frequently viewed content should be snappy and appealing. Engage professional designers and filmmakers to represent information in an arresting and elegant way. Poor visual design undermines the TLC's authority and may encourage passengers to "tune out" the TLC's important messages. Consider including a segment that raises the profile of the driver to position him as a proud service provider.

Offer useful services

Consider what information the TLC and driver can provide versus what passengers expect to provide for themselves. Can the PIM replace a cell phone or wireless email device when the passenger needs to gather information? For example, wayfinding and address look-up services could be valuable additions to the PIM.

Provide a context-specific ride

Beyond useful information services that the PIM might provide, content could be considered in terms of the arc of a passenger's ride, from point of departure to destination. The Design Trust passenger survey reveals that many riders take cabs to restaurants, entertainment, the airport, or home at night. What if the TLC took more ownership of the content strategy for this PIM, taking the pressure off the vendors to sell ad space, and instead, directed them to negotiate with relevant service providers: a range of airlines for passengers to check in online, travel websites for out-of-towners, Zagat or Opentable for restaurant information, Moviefone or Fandango for movie tickets, MenuPages or TVguide.com for those on the way home.

ECONOMIC VALUE

The financial impact of the New York City taxi system is felt by millions of New Yorkers, from the riding public to cab drivers to members of the wider taxi industry. Participants in the taxi system share a fundamental goal: to receive a fair return for their investment of time or money, what could be called economic value.

The economics of the New York City cab are complicated by the industry's dual structure: the taxi system is both a publicly regulated private enterprise and a privately run public-transportation service. Perhaps the best way to understand economic value is in terms of supply and demand. The supply side of the taxi market is comprised of fleet owners, owner-drivers, drivers, vehicle and equipment manufacturers, and other taxi-related businesses whose goals are to generate personal income and business profits. The demand side of the system is comprised of a diverse market of current and potential users of taxis. The system should provide the opportunity for good economic value for the range of taxi stakeholders:

Owners of vehicles, medallions, and garages should receive a reasonable return on their investment in the taxi system, adequate to encourage reinvestment in and improvement of the city's taxi services.

Drivers should be provided with the opportunity to earn a living wage, with the possibility of an ownership stake in the taxi system for the entrepreneurial among them.

Passengers deserve service that represents good value: a safe, reliable, and even pleasurable point-to-point experience at a reasonable cost that is competitive with private automobile usage.

The New York City Taxi & Limousine Commission's role as regulator of the taxi system extends to economic regulation, particularly of the yellow-cab (or medallion) segment of the industry. This section describes the economics of the taxi system, focusing on the medallion market, and proposes opportunities for the TLC to capitalize on its role as regulator to provide even better economic value for stakeholders in the taxi system and, by extension, for the city as a whole.

BACKGROUND & ASSESSMENT

While the yellow Crown Vic is the iconic symbol of the New York taxi, the true centerpiece of today's yellow-cab system is the medallion. According to TLC, "A taxicab medallion is a tin affixed to the hood of a New York City taxicab that represents a license from the City… The holder of a medallion possesses the exclusive right to accept passengers by street hail on the streets of New York City." Today, this tin medallion is in fact worth more than its weight in gold, with prices for unrestricted medallions in excess of $500,000. 10

10 Medallions with various restrictions—limited to use on hybrid-engine or wheelchair-accessible vehicles, or requiring that a minimum of 210 nine-hour shifts be actually driven by a medallion owner—typically command prices that are 10 to 20 percent lower than those for unrestricted medallions, which are also known as "fleet" medallions.

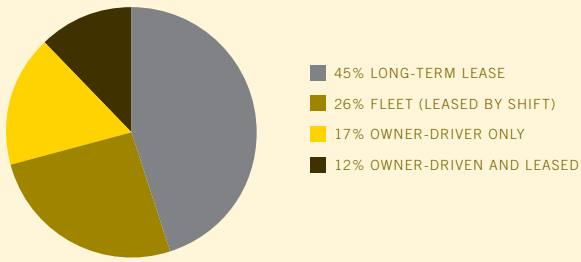
SUPPLY SIDE: OWNERS, DRIVERS, AND THE LEASING SYSTEM

Types of Taxi Ownership

Medallion buyers are willing to pay such lofty prices because of the value and power of ownership in the taxi industry. Taxi ownership, however, comes in a variety of forms. An owner-driver owns both the vehicle and the medallion; owner-drivers typically drive full time and may also lease out the vehicle and medallion to a second-shift driver. 11 In the case of the driver-owned-vehicle, commonly called a DOV, the driver owns the cab vehicle, but leases the necessary medallion, often on a long-term basis. Taxi fleets, which may range from a few cars and medallions to hundreds, own and lease both medallions and medallion/vehicle packages, usually for a half-day shift. Fleets' primary customers are fleet drivers who, lacking an ownership stake, lease both the medallion and cab vehicle. The current proportions of taxis owned by owner-drivers, under long-term lease, and owned by fleets for lease on a shift basis are shown below.

11 According to a 2005 sample, over half of owner-drivers are believed to lease to second-shift drivers (Schaller, 2006, pp. 32-33).

EC1: Taxi Ownership in 2007



Design Trust Analysis of Unpublished 2007 TLC Data

The Leasing System

Over the last few decades, the industry has evolved from one where drivers and medallion owners commonly "split the meter", sharing the profit from a given shift, to today's model, where the majority of taxi drivers pay a flat fee to lease their medallions. Medallion leases are available either with or without an accompanying leased vehicle, on a per-shift or weekly basis.

Stakeholders in the taxi industry have very different opinions about the leasing system. On one hand, the flat-fee lease creates an uncertain economic environment for both DOV and fleet drivers. With the exception of gasoline, drivers' costs are largely fixed in the form of the lease payment. Revenue, in contrast, is dependent on a variety of factors, including the number of passengers that are carried in a shift, types of trips taken, traffic, even weather; drivers essentially function as independent contractors, not employees, and as contractors are also responsible for providing their own benefits coverage (Schaller & Gilbert, 1995). However, once the costs are covered, all fare revenue is pure income for the driver; thus, simply adding one more fare per shift has a dramatic increase on the amount of revenue that goes to the driver.

On the other hand, medallion owners also experience economic constraints. Lease rates are capped by the Taxi & Limousine Commission, rather than determined solely by market forces. These caps limit potential medallion income. Meanwhile, owners are required to comply with vehicle, technology, and maintenance mandates that increase costs. While they derive an economic benefit from the non-employee status of drivers, fleet owners suggest that they bear the consequences of a highly mobile workforce with no obligation to a particular fleet. Drivers also have the flexibility to choose not to work during adverse driving conditions—bad weather, Presidential visits, etc.—but fleet owners must continue to bear the costs associated with operating a fleet garage.

Lease Caps

Aware of the economic concerns of drivers, the TLC introduced caps on lease fees in 1996, with the goal of balancing revenue allocation between medallion owners and drivers and ensuring a minimum driver income. (Recent fare increases have also had this effect, as they have not been accompanied by equivalent increases in the lease caps; see "The Impact of Regulation on Medallion Values," below.) The caps vary by shift, in recognition that busier shifts are more profitable for drivers and thus more desirable. In fact, the variation in income is significantly greater than the lease caps would suggest. At peak periods, fleets tend to charge the maximum permitted lease fee, while there may be a substantial discount for leasing during other shifts.

Not surprisingly, the lease-cap pricing and the relative popularity of specific shifts among drivers are strongly correlated with the most popular times for passengers to use taxis. For example, median lease rates for Thursday through Saturday night shifts are approximately 43 percent higher than median rates for the Saturday and Sunday day shifts. According to the Design Trust's Internet survey of more than five hundred taxi passengers (see the Appendix for more details), respondents were three to four times more likely to use taxis on weekend nights versus weekend mornings.

EC2: Lease Caps

Shift	Lease Cap	Median Lease Rate
Monday a.m.	$105	$104
Monday p.m.	$115	$108
Tuesday a.m.	$105	$105
Tuesday p.m.	$115	$113
Wednesday a.m.	$105	$105
Wednesday p.m.	$120	$120
Thursday a.m.	$105	$105
Thursday p.m.	$129	$129
Friday a.m.	$105	$105
Friday p.m.	$129	$129
Saturday a.m.	$105	$90
Saturday p.m.	$129	$129
Sunday a.m.	$105	$90
Sunday p.m.	$115	$104
Weekly–a.m.	$666	$628
Weekly–p.m.	$666	$640
Weekly–Medallion Only	$800	$775

Lease caps vary by shift. The highlighted shifts indicate those when half of all drivers are being charged the maximum amount permitted; there may be a substantial discount for other, less profitable shifts. (TLC, March 2006)

DEMAND SIDE: TAXI PASSENGERS

The demand side of the system is made up of millions of current and potential users of New York City yellow cabs. Current taxi ridership stands at approximately 240 million passengers making more than 170 million medallion-cab trips per year. Each trip serves its own purpose, whether journey to work, to or from entertainment destinations, between business meetings, or the late night ride home from a restaurant or club. All trips share one quality, however, that ties passengers into the economics of the taxi system: yellow-cab fares are strictly regulated by the TLC.

Economists generally accept that fares must be closely regulated, at least for taxis that are hailed on the street. It is virtually impossible for passengers to shop around: they can neither return to an earlier (cheaper) offer once a taxi has passed, nor can they compare quality until after the ride has ended. Moreover, comparison shopping undermines the inherent reasons for taking a taxi—speed and convenience. Fare regulation also helps to protect visitors and others unfamiliar with a city's taxis from unscrupulous drivers.

SO WHERE DO CAB FARES GO?

Passenger trips—and the fares they generate—are, of course, the fundamental source of all taxi-industry revenue, including lease payments to medallion owners. With an average fare of $9.61 per trip, plus surcharges, those 170 million annual taxi trips are approaching revenue of $2 billion each year. This fare revenue is typically distributed into three categories: driver revenue, taxicab operating expenses and fees, and medallion-owner revenue.

Driver Revenue

Fares are paid directly to drivers. That gross fare income must cover all, or a portion of, taxicab operating expenses, described below. The balance remains with the driver as revenue.

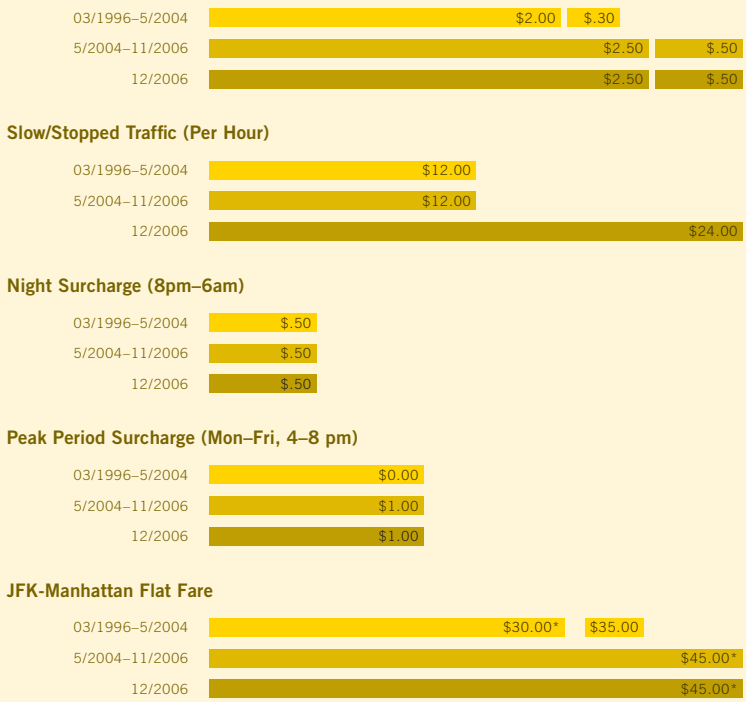
Taxicab Operating Expenses and Fees

The responsibility for costs related to operating a taxicab varies depending on which driver/owner model is in effect: owner-driver, driver-owned vehicle (DOV), or fleet arrangement. Regardless of who's paying, however—the driver or the medallion owner—costs include gas, vehicle financing and maintenance, vehicle depreciation, TLC administrative fees, and various other fees and taxes (such as insurance or fees paid to lease managers). In addition, drivers that do not own their medallions must pay a lease fee to the medallion owner. Expenses are summarized in Figure EC4.

Medallion-Owner Revenue

This is the income derived purely from owning a medallion, usually in the form of lease fees, after any operating expenses that the medallion owner must pay. For new medallion owners who financed the purchase of their medallion, much of this revenue is devoted to loan repayment. For longtime owners who have fully amortized their loans—or cash buyers—lease fees are free and clear return on their capital investment. [13] In the case of owner-drivers, lease fees from a second-shift driver augment their own driver income.

EC3: Medallion Cab Fares 1996—2006



*Increased to $35 in 2001; was from JFK to Manhattan until November 2006, now applies in both directions. Passengers are charged a "flag drop" of $2.50 once they set foot in the cab, which includes the first fifth of a mile. Subsequent miles are charged at $2, or $24 per hour for slow-moving or stopped traffic. Flat fares apply to trips to and from JFK, return fees from Newark airport, and various surcharges.

SIDEBAR: FARE COMPARISONS

Many people perceive New York's taxis as an expensive transportation option, particularly when compared with local subway and bus service. In the Design Trust's passenger survey, 83 percent of respondents agreed that they consider the potential cost of the trip before hailing a taxi. [12] By several objective measures, however, New York City taxis represent good economic value for passengers. Some data shows the ratio of average taxi to transit fare is at or near its lowest point since 1951 (Schaller, 2006).

12 See the Appendix for more on the Design Trust for Public Space Taxi 07 Passenger Survey.

Much is also made of comparisons of taxi fares between U.S. cities. Invariably, the conclusion is that New York City yellow-cab fares are lower than almost any other major city. According to the TLC, even after the November 2006 fare increase, the average NYC taxi trip costs $9.61 compared with $10.85 for a comparable trip in San Francisco or $10.08 in Boston (NYC TLC, 2006a).

"THE QUALITY OF CABS IN NYC IS INFERIOR COMPARED TO CITIES LIKE LONDON. BUT I GUESS IT'S OK, CONSIDERING WE PAY LESS."
TAXI PASSENGER, DESIGN TRUST SURVEY

The key variable for drivers is not the fare charged per mile or per unit of waiting time, but earnings per hour. New York taxis are used in fundamentally different ways from those in other cities—analysis conducted for this report suggests high-turnover, short trips are the norm, and utilization rates are extremely high by comparison—so earnings per hour are substantially higher, even though the actual fare levels are comparable or lower.

SIDEBAR: ALTERNATIVES TO MEDALLIONS

Medallion systems or similar entry controls are one of the most common methods of regulating the taxi industry, in order to limit congestion and pollution, maintain driver earnings, and protect riders. While long subject to the critique of economists and other commentators, medallion systems have survived due to a combination of practicality and the vested interests—not to mention value—of medallion holders. Alternative systems do, however, exist:

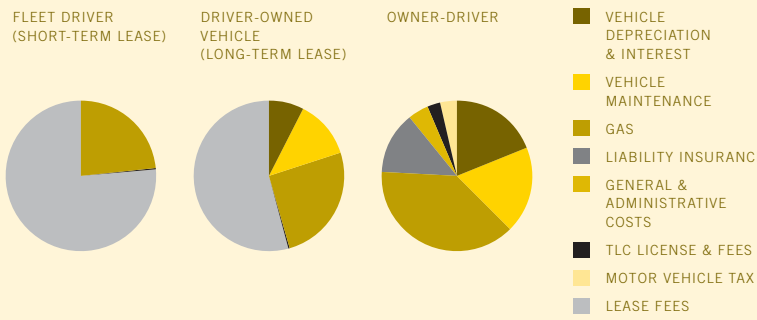
- **Strict Driver Standards:** In London, cabbies have to pass the famous "knowledge" test of the city's downtown streets, requiring two years of intensive study. This examination, rather than any numerical limit, provides a formidable barrier to entering the taxi market.

- **Franchising:** Los Angeles grants franchises to taxi firms to operate in five discrete geographic parts of the city. In the most recent round, franchises were awarded based on responses to a Request for Proposals issued by the City. Firms have to meet a range of performance targets, most notably a fifteen-minute response time for at least 76 percent of telephone calls for service.

- **Open Entry:** While economists still debate the merits of open entry (subject to minimum safety requirements), the general conclusion is that it leads to a substantial increase in supply, at the expense of poorer service quality and lower driver earnings. Segments of New York's for-hire vehicle market present a good example of this trade-off. Many U.S. cities that deregulated entry, such as Seattle and San Diego, reversed course amid a litany of complaints. "Ignorance of true market conditions, and the belief that they will succeed where others have failed, continually bring new entrepreneurs into this market," writes Roger Teal (1992).

The percentage of fare income that goes to each of these three categories is of keen interest and can be calculated in several ways. However, the answer largely depends on a cab's ownership structure: a far larger proportion of fares go to a driver that owns his or her own medallion, compared to a driver using a vehicle and/or medallion that is leased (see figure, below). Owner-drivers may take home as much as 40 percent more per shift than a DOV driver, based on TLC data on driver income that suggests average per-shift earnings of $220 for owner-drivers, compared to $153 per shift for vehicle-owning drivers who lease their medallions.

EC4: Estimated Expenses Per Shift, 2006, By Driver Type



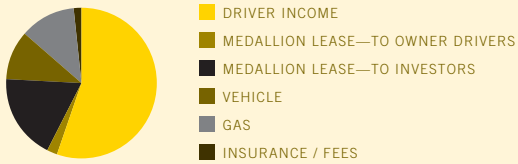
Design Trust Analysis of Unpublished 2006 TLC Data

Taxi analysts vary widely in their estimates of medallion owners' take of total fare revenue. In 2002, The urban policy magazine *City Journal* claimed that medallion holders received a $750 million cut, or 58 percent, of the then $1.3 billion in annual fare revenue (Malanga, 2002). Independent transportation consultant Bruce Schaller, in contrast, puts medallion-owner net income at $195 million, or 15 percent of industry revenue (Schaller, 2006). This discrepancy may be caused by the non-medallion owner/non-driver businesses, as the pass-through fees of agents and financing of vehicles and medallions generate significant costs.

Independent analysis of TLC figures suggests that the figure is closer to 21 percent, including a small portion recouped by owner-drivers who lease the medallion for a second shift. In other words, more of every passenger's fare goes to pay the medallion owner than to pay for the taxi vehicle itself. These figures are conservative, as they assume that owner-drivers have fully amortized their loans, when in reality some of the "driver income" will go to pay past medallion owners or (in the case of the medallion auctions), the City of New York.

EC5: Distribution of Taxi Fare Revenue

Vehicle expenses include maintenance and depreciation



Design Trust Analysis of Unpublished 2006 TLC Data

ASSESSING MEDALLION VALUES

Fair Market Value or Irrational Exuberance?

Medallion prices have increased by some 80 percent since 2001, closely tracking the growth in Manhattan real-estate prices and far outpacing the S&P 500. Given

the income generated by leasing fees and passenger fares, does this growth in asset prices represent irrational exuberance, frothiness, or reasonable valuation of an income-producing asset?

In the simplest case, a fleet medallion on a weekly medallion-only lease will generate $775 per week in gross revenue—slightly under the lease cap of $800 or just over $40,000 per year. On an annual basis, this amounts to revenue of $40,300, or a 7.3 percent rate of return on the August 2006 sale price of $525,000 plus the 5 percent transfer tax, [14] even before any capital gains from medallion price increases are factored in.

This rate of return may seem relatively low. However, it applies only to medallions purchased at current prices—a tiny fraction of the total. A fleet owner who purchased a medallion for $315,636 in 2004 would be earning a return of 12 percent and have significant capital appreciation from escalating medallion values.

Looking at the question from a different angle: based on discussions with medallion brokers and financiers, purchasers with decent credit generally qualify for 90 percent financing, or even 100 percent, as long as the buyer puts up a down payment for the transfer tax. With an interest rate of 6.25 percent and thirty-year amortization period, [15] a buyer with a down payment could get a loan of $490,000 to $515,000, which corresponds with the trading range of corporate medallions in late 2006. (A comparable analysis of the price of individual medallions for owner-drivers is shown in the section below.)

In other words, based on current interest rates and drivers' willingness to pay for weekly leases, medallion prices are rational. [16] And, for medallion owners at least, the taxi system is providing a fair economic value.

Are High Medallion Prices a Barrier to Entry?

Even if medallion prices are rational, at more than $500,000 for corporate medallions and $400,000 for owner-drivers, do prices create an insurmountable barrier for current drivers hoping to gain ownership in the industry? Perhaps surprisingly, given the income potential that medallions bring and relatively low financing costs, financial analysis shows entrepreneurial and hard-working drivers should be able to attain ownership.

For an individual medallion, calculating the rate of return is more complicated due to TLC rules, in place since 1990, that new owners must drive at least 210 shifts per year. However, the rate of return can be understood as the savings that owners make by avoiding the need to lease a medallion.

According to TLC data, typical take-home pay for owner-drivers is more than $220 per shift, compared with $153 per shift for driver-owned vehicles who simply lease their medallions. Assuming an owner-driver works six days per week, fifty weeks per year—or 300 shifts—the medallion provides a saving of $20,274 per year, or a 4.7 percent rate of return on the August 2006 sale price of $407,000. This explains why many (but by no means all) owners lease their cab for a second shift, and why owners need to drive longer shifts and work more days to make their medallion payments.

Even if owner-drivers worked only 210 shifts per year (the minimum required by the TLC), they would earn $14,000 more than their DOV counterparts. In addition, if owner-drivers lease their medallion for 70 percent of the remaining shifts in the year, they can earn another $26,000. Assuming income taxes eat away 25 percent of the $40,000 additional revenue as an owner-driver, a driver is left with

14 Traditionally, buyers pay the 5 percent New York City transfer tax. Note that soft costs such as broker fees are not included in this calculation.

15 Interviews conducted by Design Trust fellows indicated that twenty-five- to thirty-year amortization periods on a loan of three to five years were typical. (Note that loans are sometimes non-amortized.) Medallion Financial's 2005 Annual Report indicated average loan rates for NYC taxi medallions were 6.23 percent.

16 They will also be sensitive to shifts in the credit markets – based on this valuation model, a 1 percent (100 basis point) increase in interest rates would reduce medallion values by approximately $50,000.

$30,000 per year of income that could be used to finance the medallion investment. Assuming the same financing terms described above for fleet medallions, the entrepreneurial driver could afford to pay up to $405,000 for their medallion —not a bargain, but a fair value given the earning potential of the medallion. "It's not easy work, but it's good work and it's also work where someone is in control of his own destiny," said one major lender in a Design Trust interview. 17

Double-shifting, however, is by no means universal, and only 41 percent of owner-drivers lease their cabs for the second shift (Schaller, 2006). "Some don't want anyone else driving their car," one former owner-driver told the Design Trust. "It's not totally free money because the insurance premium and the wear and tear on the vehicle go up quite a bit for a second driver. Sometimes they feel that it isn't worth it. It also limits their own working time."

Notwithstanding the rationality of medallion prices "on paper," several observers do suggest that prices have reached their practical limit and may be due for a correction. Recent rises have been based on "stretched out financing" —i.e., longer amortization periods, said one lender. With a typical loan now amortized at thirty years, compared to three to five years in the 1970s, there is little room to increase this further. 18 According to another broker interviewed by the Design Trust, prices have already deterred most pure investors, who can find better returns elsewhere. In his opinion, "It makes no sense right now as an investor."

17 While researching this document, the Design Trust project fellows interviewed a broad range of industry stakeholders, taxi advocates, and other experts. To respect the sensitive nature of some interview material, quotations from the interviews are presented anonymously. A complete list of interview participants can be found in the Acknowledgments section.

18 TLC research suggests, however, that as amortization periods have lengthened, the amount that drivers pay per month in financing has remained relatively constant; this figure has held steady between $1,300 and $1,700 since the early 1990s.

THE IMPACT OF REGULATION ON MEDALLION VALUES

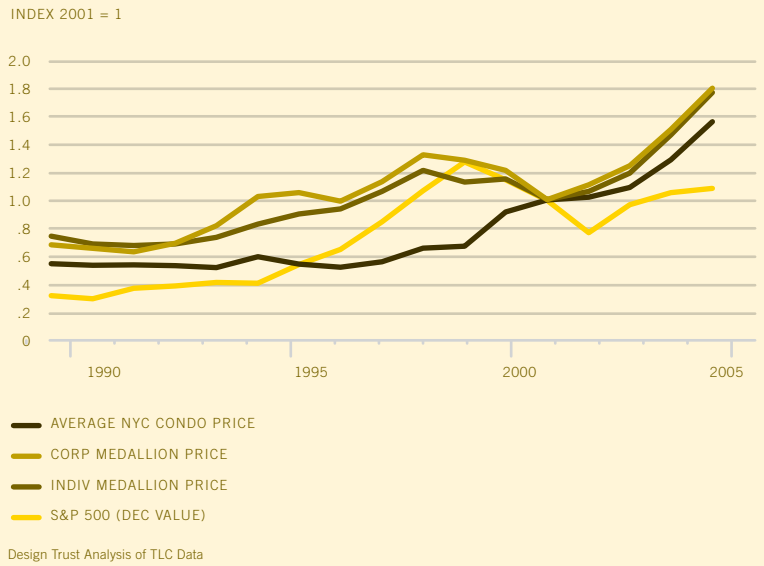
Much of the rise in medallion values can be seen as a result of the stable, predictable regulatory environment that the TLC has provided over the past few decades. "The fact that we have a very strong Taxi & Limousine Commission that supports the price of the medallion is very important," one owner told the Design Trust. The industry complains about regulation, "but if you look back on it, that over-regulation is what keeps the medallion price so high, so steady." Discussion about the portion of fare revenue or the rate of return that goes to medallion owners is of more than casual interest, as it goes to the heart of TLC's role as an economic regulator. Many regulatory decisions by TLC have implications for industry costs—standards for vehicles and requirements for new technologies and services are just two examples.

It should also be noted that recent fare increases have not necessarily been accompanied by an equivalent increase in the lease caps. In effect, fare changes over the past decade have benefited drivers to a greater extent than medallion owners. According to the Metropolitan Taxicab Board of Trade, a medallion-owners organization, drivers received 60 percent of the value of the 1996 fare increase; in 2004, drivers received 85 percent of the fare increase as well as the $1 peak surcharge; and in 2006, drivers received 100 percent of the fare adjustment.

Understanding the current distribution of fare revenue among system participants helps clarify how mandated costs will affect industry returns. From a regulatory perspective, it can be argued that the most important observation is that nearly twice the amount of fare revenue goes towards medallion lease fees as to vehicle costs. Even with the more stringent vehicle standards set in recent years, the cost of buying and maintaining a taxi vehicle is only a fraction of the current income that the vehicle can generate through lease fees. For example, if new vehicle

standards increased hack-up expenses (the cost of adding cab-specific vehicle modifications, such as the meter) by $15,000 and all additional costs were amortized over three years, this would increase costs per shift by around $7, or approximately 6 percent of current fleet lease rates per shift.

EC6: Medallion Sale Trends, 1989-2005



Design Trust Analysis of TLC Data

REGULATION AND SYSTEMIC INVESTMENT

When TLC contemplates the economic impact of new costs to the industry and who bears those costs, it essentially has three choices:

The passenger—if requirements are accompanied by a fare increase
The driver—if requirements are accompanied by an increase in the lease cap
The owner—if no changes are made to fares or lease caps 19

19 Note that owner-drivers, unlike other participants in the system, will see increased costs under two out of three of these options.

Since the City has control over both fares and lease caps, it has substantial control over the returns to medallion investors, and the prices of medallions. The last two 2006 fare increases, for example, led to increased driver revenue, but did not provide for an equal increase in medallion-owner revenue, as the lease cap was either left unchanged or increased at a smaller rate. Previous fare increases had typically provided for a fifty-fifty split between medallion owners and drivers, as the fare change was accompanied by increases in lease caps.

By the analysis above, it seems likely that medallion owners could bear the cost of additional required vehicle and service improvements. The costs of those improvements could contain growth in medallion prices while also causing fare revenue to be reinvested in the industry. In effect, stricter standards would recoup for taxi users an additional portion of the capital gains made by medallion owners in recent years.

STRATEGIES

The strategies presented below provide a range of mechanisms for consideration by the TLC. In every case, the intent is to improve the degree to which New York City's taxi system provides a good economic value to passengers and to service providers.

Not all strategies are required to see a meaningful impact. However, the effectiveness of each is dependent on the implementation and monitoring of a data-collection process, as described in the introduction to this part of the book.

PROVIDE ECONOMIC INCENTIVES FOR TAXI AVAILABILITY

One of TLC's most important responsibilities as a regulator is to encourage efficient matching of supply and demand, ensuring taxi service when, where, and for whom it's most needed. While the Efficiency section, below, is devoted to this topic, certain specific recommendations relating to economic regulation are discussed here.

Solving the mismatch of supply and demand, particularly during peak periods, is not as simple as issuing new medallions, as that could lead to worsened congestion in both peak and off-peak periods. Effective availability during the peak could be increased, however, by altering fare regulations related to ridesharing and the peak-period surcharge.

Institute Rideshare Fares

Reduced fares for passengers willing to share a ride can be found in many other cities. At London's Paddington Station, up to six passengers with similar destinations can choose to share each taxi at peak times. They pay a flat fare calculated on a zonal basis and are directed by staff to the appropriate taxi (Transport for London, 2003). In Chicago, up to four passengers can share a taxi for a flat per-person fare; the program operates from O'Hare and Midway Airports, and from the convention center to downtown and the airports. The more sophisticated programs use meters that are programmed with a special "rideshare" tariff. In Rome, for example, the rideshare tariff applies to trips with three or more passengers, each of whom pays about 40 percent of the regular fare.

Ideally a rideshare fare structure would encourage passengers and drivers to increase utilization of each cab trip, particularly during peak-demand peri-

"Rideshare programs in New York City have uniformly failed, with the one exception being York Avenue, where cabs act as miniature buses in the area of Manhattan that most lacks subway service. I've seen virtually no successful taxi rideshare programs in the U.S. The only place where I'm aware of a cab company providing rideshare (Madison, WI), their market share is steadily declining."
Bruce Schaller, Schaller Consulting

ods. TLC could consider a modified fare structure that would be in force from, say, 4 p.m. to 8 p.m. during weekday evenings. For example, if two customers at Park Avenue and E. 50th Street share a taxi to the Upper West Side, each would be required to pay 75 percent of the full fare to their respective destinations. The customers get a 25 percent discount for sharing, the driver gets a 50 percent premium, and one taxi trip increases its utilization by 100 percent. [20]

An existing variant of this recommendation is already in place for morning trips from York and E. 79th Street to Wall Street, which depending on quantitative analysis of availability, might be appropriate to expand to additional Upper East or Upper West Side locations. Additional rideshare taxis would need to be sited in peak pick-up areas; electronic trip-sheet data [21] could be used to determine appropriate locations for new taxi stands in the central business district.

Additional planning and implementation stages could include expanding the digital seatback interface—the passenger information monitor—to include calculation and display of rideshare fares; initiating a design process to develop appropriate street furniture and information graphics for new rideshare taxi stands; and public outreach to explain the new rideshare rules and locations. (For more on this topic, see the Efficiency section.)

20 Of course, a group ride program could increase demand by dropping the price. If so, the increase in person trips supplied might not cover the increased demand, making it potentially harder to get a cab, not easier.

21 Drivers must maintain a record of each fare; traditionally, this information was recorded on paper trip sheets, which medallion owners were required to store for three years. New metering technology, being installed from 2007 on, will record the pick-up and drop-off location of each fare, the total fare amount and distance, and other trip data. TLC will be able to receive the data digitally.

"ALLOW TAXIS TO TAKE MORE THAN ONE FARE, WHICH WOULD EASE CONGESTION AND MAKE IT EASIER TO GET A CAB."
TAXI PASSENGER, DESIGN TRUST SURVEY

Expand the Peak-Period Surcharge

In 2004, a $1 peak-period surcharge was added to medallion cab fares between 4 p.m. and 8 p.m. on weekdays. This surcharge manages supply by encouraging drivers to be on duty during peak times; it regulates demand by increasing costs during peak hours.

The TLC could alter the surcharge to further influence supply and demand. The cost of the peak surcharge could be increased, creating an additional dampening of demand during the peak period. Duration of the premium period could also be expanded, for example, to cover late-night periods when the City may wish to prop up taxi supply to ensure this transportation method is readily available for safety or other reasons.

There is limited data on the extent to which the surcharge has helped dampen demand for taxis during busy periods. However, Bruce Schaller calculates the elasticity of the New York City taxi fare to be -0.22, meaning that a 10 percent fare hike would reduce short-term demand by 2.2 percent (Schaller, 1999). Doubling the peak-period surcharge to $2 would therefore be likely to reduce demand at this period of time by just over 2 percent, assuming an average fare of approximately $10. Since many neighborhoods have more potential passengers than empty cabs at peak times, an increased surcharge would likely result in fewer waiting pas-

sengers, rather than more available cabs. In effect, taxis would be allocated by passengers' willingness to pay, rather than their willingness to wait. Using reliable, near real-time performance data from electronic trip sheets to test outcomes, TLC could monitor peak availability and usage data to identify the impact of any surcharge increase or expansion of peak period. Using those results, TLC could alter the fee or time period as necessary. This could occur alongside a public outreach campaign that explains the new surcharge, including information that encourages shifting trips to off-peak periods or to mass transit.

In pure economic terms, as long as a fare increase does not reduce demand so much that utilization drops during peak hours, then it is economically efficient. Taxis will continue to carry higher value trips during the peak, and other potential taxi users will be encouraged to use mass transit. Increased premium fares could be adopted either independently or in concert with rideshare fares. Such changes to the fare structure could be part of a package that is either revenue neutral or that supports other policy goals, such as more stringent vehicle requirements or cost-of-living adjustments for drivers and/or owners.

SUPPORT REGULAR, SUSTAINABLE ECONOMIC CHANGE

Economic regulation of the New York City taxi system should occur at regular intervals and be tied to particular economic indicators, encouraging a steady, demand-driven release of medallions and sustainable medallion prices. Sustainable growth in the number and cost of medallions would encourage investment by taxi-industry participants—specifically drivers—while further discouraging absentee ownership and speculation, given the reduced potential for investment revenue.

Issue New Medallions Based on Availability Benchmarks

From 1937 to 1996, not a single new medallion was issued; some 1,300 medallions were added to the fleet from 1996 to 2007. These additions were made after state and city legislation was passed and a comprehensive environmental impact study was undertaken. This study included research in areas such as the impact on traffic conditions and taxi demand evaluations. In the future, data collected from electronic trip sheets could be used to determine whether additional medallions are necessary.

Adjust Lease Caps to Reflect Market Conditions

Current medallion prices are a function of the capitalized value of future lease payments. Like other capital markets, lease payments represent a relatively fixed income stream for medallion owners; and so, as prevailing interest rates rise, medallion prices will fall and vice versa. An additional factor in the value of medallions is driver supply—the more drivers compete for leasing a given shift, the more likely it is that actual lease prices will reach the capped level.

TLC could monitor credit markets and adjust lease-cap rates on an annual basis, based on major shifts in credit markets. For example, as shown earlier in this section, the current average weekly lease ($775) and interest rates for medallion loans (6.25 percent) justify a medallion price of $518,000. If credit markets allowed interest rates to fall by 50 basis points, to 5.75 percent, medallion prices might rise by some $30,000 if TLC took no action. However, if TLC were to reduce the lease cap instead—following the previous example, to $735 a week—and

"Medallion prices have never been linked to regulation of the fare or regulation of lease rates. Rather, rates of fare and lease rates are adjusted to offset inflation and increasing operating costs for both owners and drivers. The City has never manipulated the medallion price, nor should it. Men and women have invested their lives and livelihoods in these investments and to suggest that the City intervene and artificially lower the return on these investments is at best a violation of the agreement that the City entered into with the medallion purchaser and at worst, illegal."
Metropolitan Taxicab Board of Trade

make a comparable adjustment to daily lease caps, in theory the value of fleet medallions should hold steady at $518,000.

Consider Fare Increases on a Predictable Basis

TLC could contemplate increasing taxi fares to achieve a number of different policy goals. Whatever the intended goal, however, the taxi system would benefit from consideration of fare increases on a regular and predictable schedule.

"After a fare increase, there is usually a slight dip in demand. However, in cities that use an indexed system (e.g., rates go up on a yearly basis, based on cost-of-living increases), these dips do not occur or occur in a less distinct way."
Wim Faber, Transportation Journalist

SUPPORT DRIVER OWNERSHIP

In addition to supporting sustainable growth in medallion numbers and prices, the TLC has a number of opportunities to further support driver entrepreneurship. (See the Usability section, above, for more on the safety and customer-service benefits of promoting driver ownership.)

Expand Ownership Education

TLC could provide additional information and education to encourage new owner-drivers. This outreach effort would continue the TLC's commitment to providing easy-to-understand information on the economic opportunities offered by the taxi industry. For example, in 2006, the TLC hosted a series of informational seminars to explain industry structure, medallion ownership, and purchase procedures for the then-upcoming auction of 254 alternative-fuel and 54 accessible medallions. The events included detailed question-and-answer sessions, designed to assist participants in making an educated decision about medallion ownership. An expansion of this program might include explaining to drivers their rights under the lease-cap system, how to improve their credit, and ways to approach ownership entrepreneurially, so that associated costs could be brought closer to the cost of leasing.

Introduce Leasehold Medallions

When market conditions show that issuance of new medallions is necessary, the TLC could issue a new series of medallions in the form of a non-transferable leasehold, in lieu of future asset sales. With leasehold medallions, drivers would pay a fixed monthly rent directly to the TLC; rent payments would provide ongoing revenue to offset TLC costs or to fund new initiatives. The term of the leasehold could be linked to the lifespan of the vehicle, typically three to five years. The advantage of leasehold medallions is that they would not be subject to speculation by industry outsiders, and they could be revoked at the time of vehicle retirement if TLC needed to reduce cab supply. Appropriate controls as to the total number of leasehold medallions and the frequency of their release would have to be determined based on reliable benchmarking exercises.

"This leasehold proposal puts the City of New York in the role of leasing agent, placing the City in direct competition with the very fleets and leasing agents that it regulates. By releasing "rental" medallions, the City will draw upon a limited driver pool that is already being taxed by existing medallion-based businesses. The City's best interest is in seeing that the existing 13,000 taxicabs are effectively servicing the riding public—that includes the ability of fleet garages and lease managers to attract drivers and for these businesses to stay in business themselves."
Metropolitan Taxicab Board of Trade

BOOST REINVESTMENT IN SYSTEM IMPROVEMENTS

Proposals to improve New York City cabs invariably end in a "wish list" of vehicle, dispatch, or driver-training improvements. Usually, the primary argument against these is cost, with fleet owners and drivers insisting that mandated improvements would lead to bankruptcy without a commensurate fare increase. If the TLC prefers that system improvements be revenue-neutral even in the short term, then increases in fares and lease caps could be keyed to any new increases in mandated hack-up costs. For example, $15,000 in additional up-front costs equates

to roughly $7 per shift if depreciated over three years; this would justify a lease cap increase of 6 percent for owners or a 2.3 percent increase in fares. However, it's possible to approach system reinvestment from a range of other perspectives.

Assess Long-Term Economic Impacts of New Hack-Up Costs

System improvements can be assessed in relation to long-term impacts on medallion value, rather than to short-term effects on revenue. In recent years, despite ongoing mandated improvements in cab standards, medallion prices have continued to rise rapidly. This track record suggests that TLC has considerable flexibility to require investment on the part of the medallion-cab industry; rather than decrease driver incomes or long-term medallion-owner profits, required improvements would more likely slow the rate of medallion appreciation. (Note that for-hire vehicles, in contrast, have no medallion appreciation that can be used to back investment. Any requirements for investment would likely have a concomitant impact on fares. In the medallion industry, drivers who own their vehicles, but not their medallions, would also bear mandated costs not offset by medallion equity.)

Adjust the Medallion Transfer Tax

The City levies a 5 percent transfer tax on the resale of any medallion. This tax is based on the rationale that medallion values are in part an artifact of the City's limits on supply, and therefore the City is entitled to a share of appreciation in value. In recognition of the fact that appreciation in medallion equity is not necessarily available to the owner until the point of sale, the City takes its cut when the medallion is transferred, rather than on an annual basis.

Shifting the tax from a percentage of sale price to a percentage of capital gains would have the benefit of increasing liquidity in the medallion market, as the current penalty for frequent changes of ownership would be eliminated. Increasing the rate at which the transfer tax is applied could generate higher levels of revenue for the City. Revenue could be reinvested in the taxi system, through an industry fund to develop driver-education programs, to subsidize the purchase of zero-emissions vehicles, to support research and development of new taxi technologies or vehicles, or to offset TLC administrative fees.

SIDEBAR: LOCATION-SPECIFIC CONTENT: THE FUTURE OF CAB REVENUE?

With the emergence of IMS (Internet Protocol Multimedia Subsystems), information and advertising will soon be deliverable across fixed and mobile devices, on any networked screen, from a billboard to a handheld device. Combine a cab's GPS-enabled capacity to be tracked geographically, with its seatback passenger information monitors (PIMs), and location-based content that can be streamed to any screen, and you have the potential to associate what a passenger sees on a screen inside his cab with content displayed in the passing streetscape, on billboards and in shop windows.

Any TLC implementation of such technologies would have to balance the interest of advertisers in reaching potential customers against the comfort of passengers in an increasingly media-saturated environment. It's possible, however, that location-specific ad-driven content could provide a passenger benefit. Riders could express preferences at the start of the ride and watch for related content on dedicated screens in the cityscape as they passed by. Or, the passenger could request details about items in shop windows or exhibits in museums, for display in the PIM as the vehicle approached related locations. As cabs became mobile narrators of New York's physical landscape, content providers would jump at the opportunity to be represented on this channel. In turn, the business model for cab revenue could be diversified, relying less on fares and lease payments, and more on placement fees from on-board content providers.

EFFICIENCY

There are many dimensions along which to measure taxi efficiency. From the vehicle perspective there is fuel efficiency—how many miles the vehicle can travel on a gallon of gas. From the driver perspective a measure of efficiency could be how productive the shift is in providing revenue—i.e. how much time is spent cruising for passengers and how much time is spent serving passengers. The passenger perspective may hinge on the difficulty in finding a cab for a given trip and the travel time of the trip.

From a regulatory perspective, the City must reconcile these disparate views and also understand the taxi in the context of the public realm. It is a huge boon to New York that so few residents own their own automobiles. If New Yorkers owned cars at the same rate as most Americans, the city would have 3.2 million more cars. To park those cars—at 160 square feet per car—would require over 11,000 acres of real estate or fourteen times the area of Central Park.

Instead, New Yorkers rely on sharing the approximately 13,000 medallion taxis and 40,000 for-hire vehicles to fill travel needs when walking, public transit, or other modes do not suffice. The efficient use of space New York gains by relying on this system allows for more parkland, more opportunities for culture and entertainment, and more variety in retail. Efficiency in the taxi industry must be viewed in light of all these dimensions:

Passengers must find taxis to be convenient and speedy enough that they provide an effective service worth using.

The city will benefit if cabs continue to function as one component of New York's mass transit system, providing space and environmental advantages superior to the use of private vehicles.

To earn a living wage, drivers and owners require a sufficient population of (and demand for) taxis—without there being so many cabs that supply outstrips demand, revenues drop, and traffic is increased to levels of inoperability.

This section focuses on how the New York City cab system is working and how it could be made even more efficient—in other words, how to get the right cab in the right place at the right time. As the regulator of New York's taxi services, the New York City Taxi & Limousine Commission's efforts to increase efficiency could focus on making it easier to get a cab at peak times, while reducing the amount of cruising by empty taxis at other times of day. Of course, these measures will also bring benefits to this book's other areas of focus: economic value (higher occupancy rates mean more income for the industry); usability (a comfortable taxi is to little avail if a would-be rider cannot get a cab in the first place); and environmental sustainability (fewer empty cabs circling mean fewer emissions).

BACKGROUND & ASSESSMENT

EMPTY OR FULL? DUELING PERSPECTIVES ON CAB AVAILABILITY

A frequently heard gripe is the inability to find a taxi when one needs one—on a wet afternoon in Midtown, for example. Legends have emerged of the lengths to which people will go to get a cab, and city dwellers have formed their own rules of etiquette to determine who has priority for the first available taxi. "Hailing a cab remains a combat sport," declared the *New York Times* (Watson, 2001).

But that rainy afternoon represents the most intense demand cab drivers will experience. To serve it would require a fleet of taxis far greater than the number required to serve normal demand. This, in turn, implies that there would be many hours of cruising time for the excess fleet. Furthermore, flooding the market with additional cabs could easily have an adverse impact on traffic. If you were the lucky New Yorker to get a cab, you would then be relegated to sitting in the vehicle unable to move through congested streets.

To hear from cab drivers, one would think that they were working in a completely different city. Estimates vary, but medallion cabs only carry passengers between 57 percent and 61 percent of the time. The rest of the time drivers are cruising empty, either looking for a fare or returning to their bases.

The reason for the disparity in these tales, of course, is that patterns of taxi supply and demand vary considerably both spatially and temporally. In other words, there are "hot" spots and times where demand is high and "cold" spots and times where supply is low, which means cabs are plentifully available at some times of day and less available at other times.

PATTERNS OF DEMAND

To better understand patterns of demand in the New York taxi market, Design Trust fellows analyzed electronic trip-sheet data for over 5,000 medallion-taxi trips, 3,700 of which included specific origin and destination data. These trips were provided by at least four different yellow cabs over the six-month period of July to December 2005. 22 The data provide a picture of the durations and distances of typical cab trips, levels of utilization versus cruising, the time and location of cab hot and cold spots, and the dispersal of airport trips.

22 Trip data was anonymous, so it's not possible to ascertain the number of unique drivers that piloted the cabs in the trip sample.

SIDEBAR: WHY CAN'T YOU GET A CAB?

Trouble catching a cab can have different primary causes depending on location and time of day. Scarcity during rush hour has three major causes:

- **Increased Demand:** It's difficult to get a cab anywhere at peak times, in the same way that it takes longer to get a table at a restaurant at dinnertime—you have more competition from other passengers.
- **Congestion:** Slow traffic at peak times increases the length of each trip, cutting the number of passengers that a single cab can service in a given time frame and effectively reducing the availability of cabs during the peak even further.
- **Shift Changes:** New Yorkers' favorite explanation for cab scarcity during rush hour is that all the cabbies are back at the garage, switching shifts. While this may be partly true, the effect is probably overestimated: many drivers meet up to switch shifts on the streets of Manhattan.

Off-peak scarcity is driven more by physical and geographic constraints:

- **Loading Space:** At venues such as theaters and transit hubs, there may be enough passing cabs to serve all potential customers, but the limited physical space at the curb and on the street limits how many cabs can simultaneously load their passengers.
- **Cab Density:** Drivers naturally cruise where the majority of the fares are. Street-hail service in the outer boroughs will always be more limited for this reason.

Economics also plays a role. During late-night hours, drivers may choose not to drive, rather than incur costs while cruising for scarce passengers.

A cab driver can be likened to a pinball in a pinball machine—the driver goes where the passenger directs and then picks up the next rider on a rebound, ideally as close as possible to the previous drop-off point. In practice, the progression is not always so clear. For example, the map of taxi trip origins (Figure EF1.1) shows very few trips originating on the Lower East Side, both east and west of the Manhattan Bridge. One might infer that there is no demand in that region, but a close look at the map of destinations (Figure EF1.2) shows the same blank. If no passengers direct a cab to that location then people waiting in that area will find it difficult to hail a cab. The same cannot be said so unequivocally of trips north of 110th Street, where there are virtually no trip origins between Third Avenue and Amsterdam, even though a sprinkling of trip destinations are evident. The disparity suggests either a complete lack of customer demand or a choice on the part of drivers.

"IT'S IMPOSSIBLE TO FIND TAXIS ON YORK, FIRST AND SECOND AVENUES."
TAXI PASSENGER, DESIGN TRUST SURVEY

Relative to trip origins, destinations are more heavily concentrated in Midtown. Regardless of these origin/destination disparities, yellow-cab trips are very highly concentrated in Manhattan. Indeed 85 percent of yellow-cab trips originate in Manhattan and 86 percent have Manhattan destinations (Figure EF2). The distribution over time of day is fairly flat, with one big dip occurring between 4 and 7 a.m. As discussed below, in the section on airports, a disproportionate share of trips to LaGuardia Airport occur in this time period.

Overall, in the examined sample of over 5,000 trips, 85 percent originated in Manhattan south of 126th Street; 11 percent at LaGuardia Airport; 3 percent in Downtown Brooklyn, Williamsburg/Greenpoint, Astoria, or at JFK Airport; and the remaining 1 percent of trips originated throughout the city. Trip destinations were also heavily concentrated in Manhattan (86 percent), but the trips made to destinations outside of Manhattan were slightly more dispersed, with only 1 percent going to JFK, 3 percent to LaGuardia, 3 percent to Downtown Brooklyn and Williamsburg/Greenpoint, and the remaining 6 percent to 7 percent distributed across Upper Manhattan, the Bronx, Brooklyn, and Queens. No trips were reported to Staten Island.

Trip Distances and Durations

The average distance of a yellow-cab trip in NYC is 3.7 miles, but the vast majority of trips (two-thirds) are 2 miles or shorter (Figure EF3). The average trip distance throughout the day varies from slightly over 3 miles at noon to approximately 5.3 miles between 5 to 6 a.m. (Figure EF4). Ninety-five percent of the trips are under half an hour in duration—the average is thirteen minutes. But over half are only three to twelve minutes long (Figure EF5). The trips are pretty speedy, as cabbies average 15 miles per hour once they have you in the cab; they cruise a little more slowly when looking for a fare, at about 7 miles per hour.

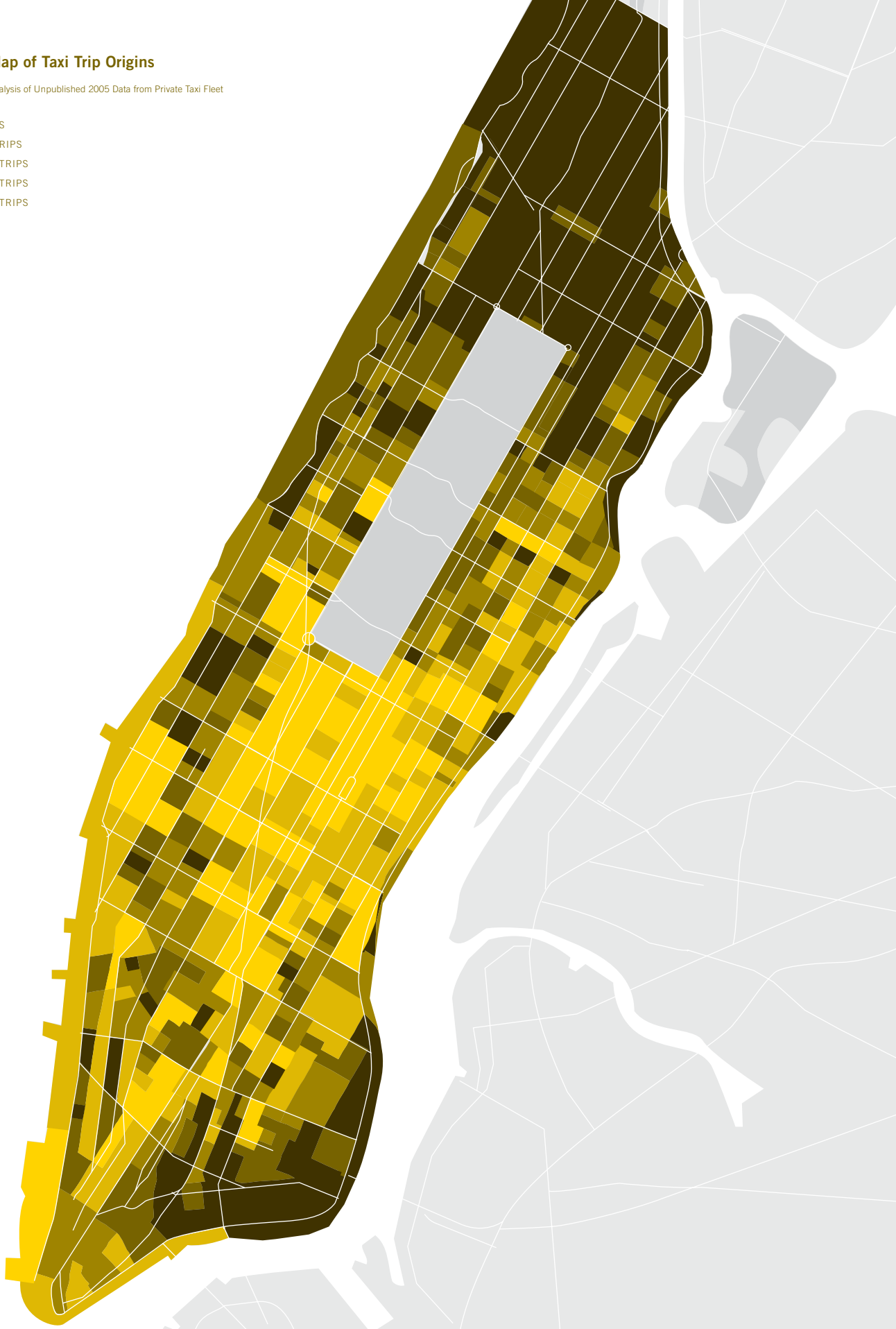
Spatial Patterns: Hot and Cold Spots

Figure EF8 shows how long it took a driver to find the next fare after dropping off a passenger. The trip sample suggests there are some spots that are dead zones

EF1.1: Map of Taxi Trip Origins

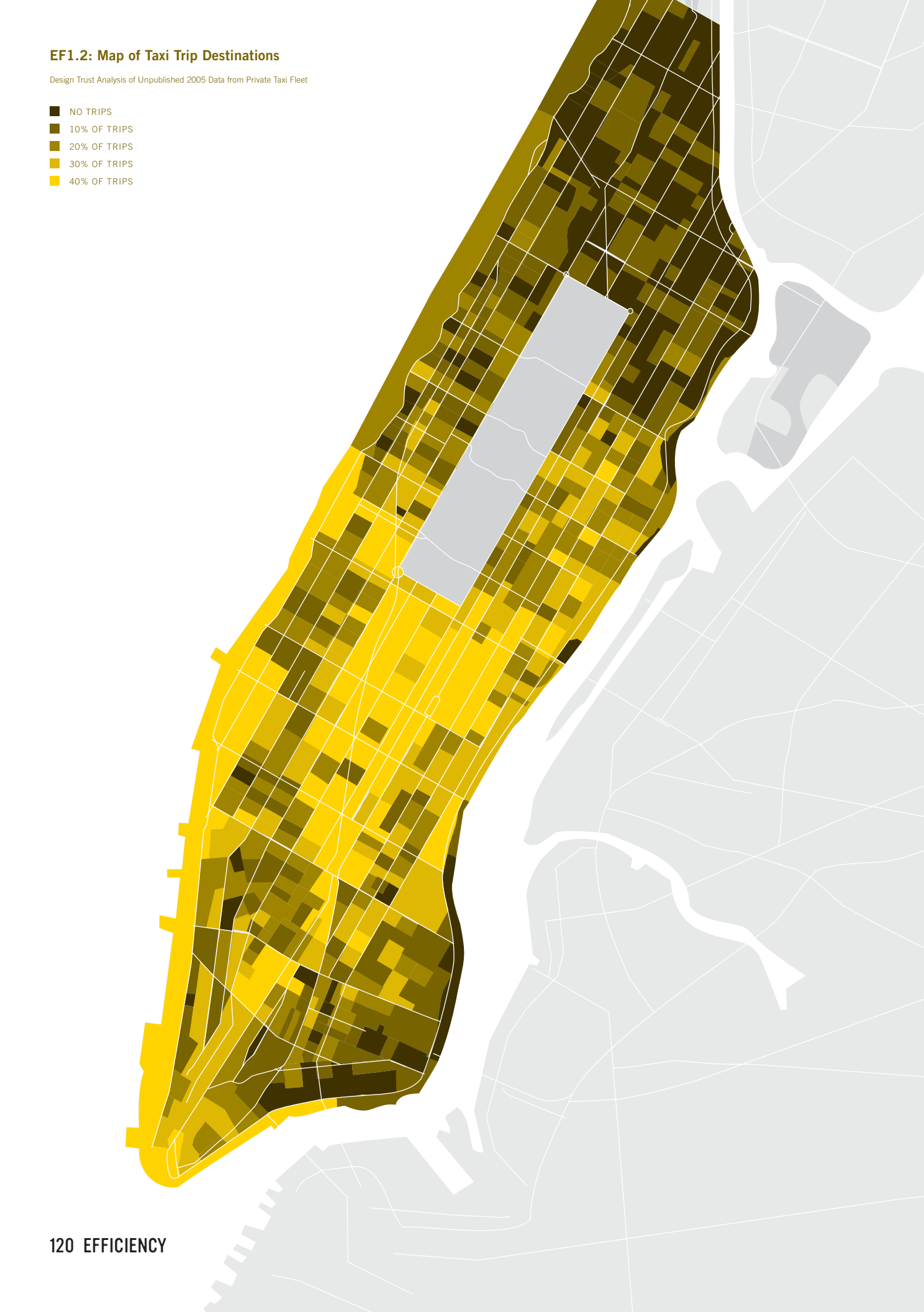
Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

- NO TRIPS
- 7% OF TRIPS
- 18% OF TRIPS
- 26% OF TRIPS
- 49% OF TRIPS

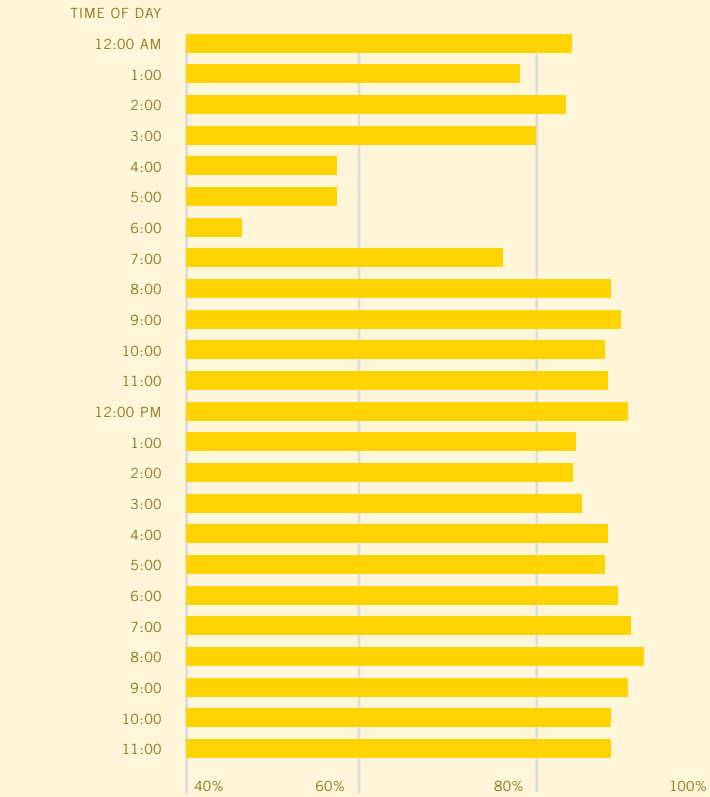


EF1.2: Map of Taxi Trip Destinations

Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet



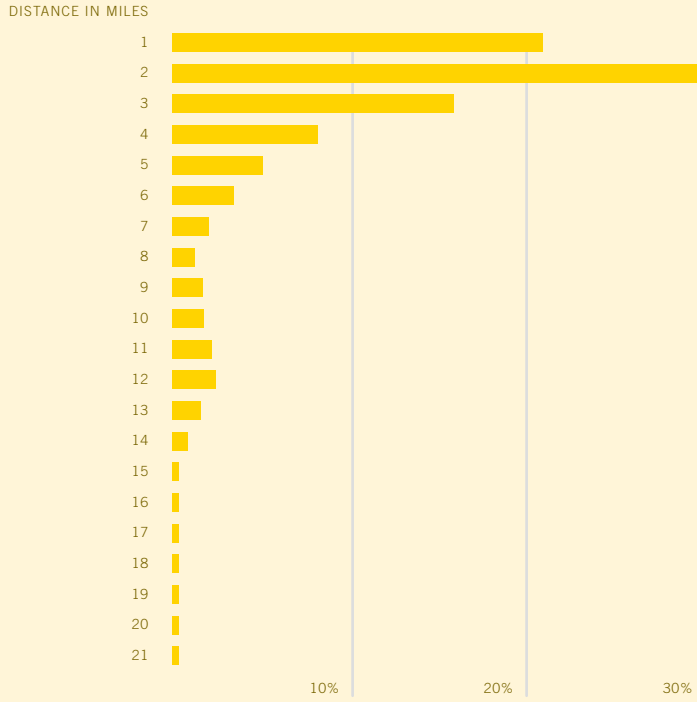
EF2: Percentage of Taxi Trips with Manhattan Destinations



Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

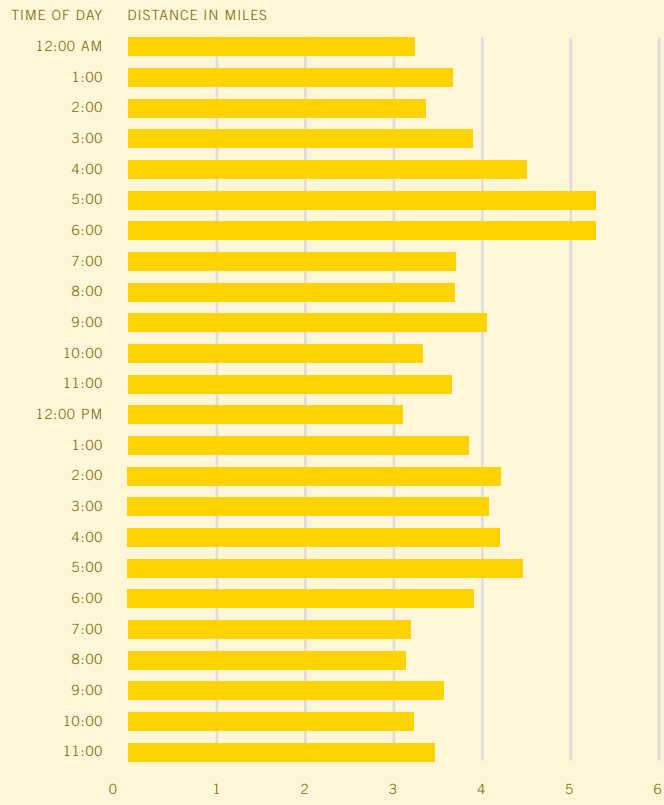
EF3: Trip Distance

50 percent of taxi trips are two miles or shorter



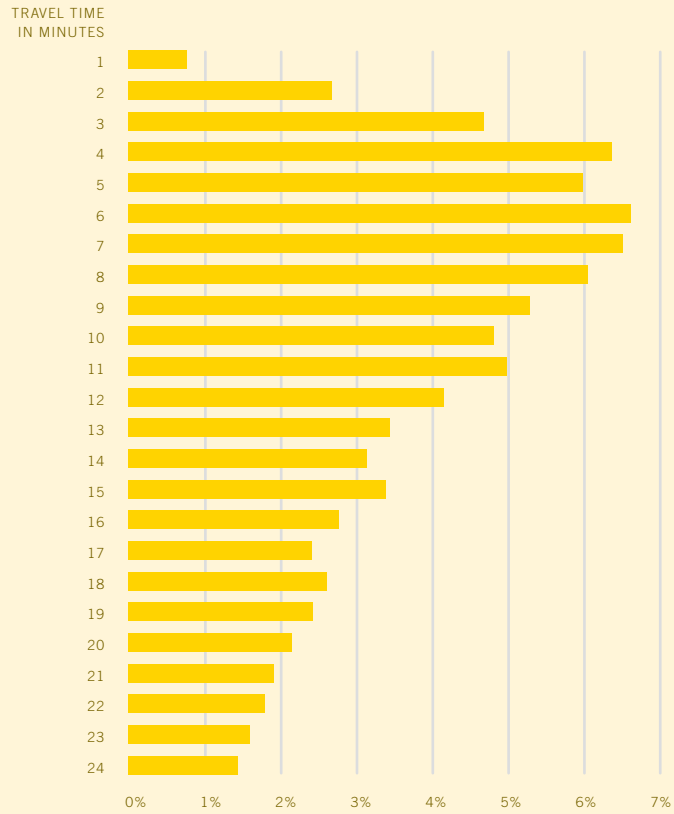
Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

EF4: Average Trip Distance by Time of Day



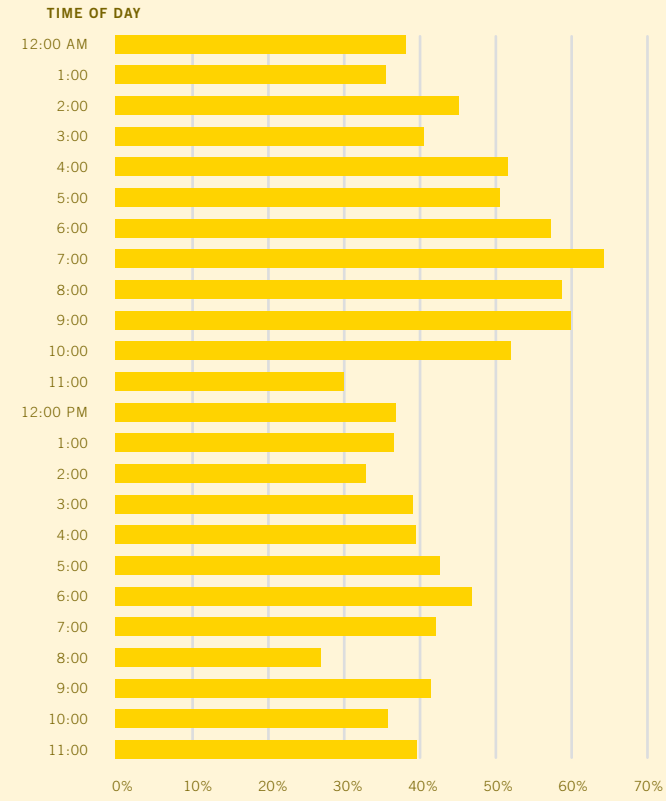
Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

EF5: Trip Length Distribution (Time)



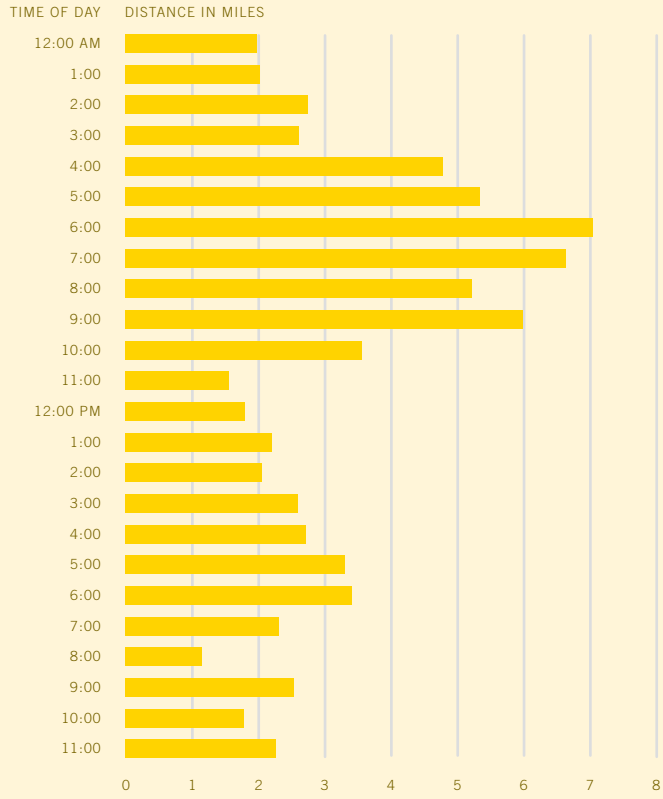
[source] Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

EF6: Percent of Time Cruising Each Hour



Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

EF7: Average Cruising Distance Each Hour



Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

for drivers: no matter what the time of day, no new passengers are to be found. Throughout the day, trips cluster around Midtown and along the east side of Central Park. This pattern is even more pronounced around lunchtime (Figure EF8.1). At 8 p.m. things begin to heat up in the East Village; destinations to the area begin to emerge in a pattern that does not exist at other times of the day (Figure EF8.2). And the Village crowd tends to head home between 11 p.m. and 2 a.m. (Figure EF8.3).

All maps at right: Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

Temporal Patterns: Peaks and Troughs

As noted above, medallion cabs generally carry passengers only between 57 percent and 61 percent of the time. The most efficient hour from the driver's perspective is between 8 and 9 p.m. when the cab is servicing a passenger 73 percent of the time. (It may be fair to say that 75 percent is about the maximum possible system efficiency, taking into account times when passengers are getting in and out of the cab, returning to the garage, etc.) Of course this corresponds exactly to the time when it is hardest for a taxi passenger to get a ride. After that, the most productive time is between 11 a.m. and 1 p.m.

"CAB AVAILABILITY IN MANHATTAN DURING PEAK HOURS IS A PROBLEM. IT'S NEXT TO IMPOSSIBLE TO GET A CAB IN THE MORNING."
TAXI PASSENGER, DESIGN TRUST SURVEY

The least efficient hour for the driver is between 7 and 8 a.m., when the cab is servicing a passenger only 36 percent of the time and cruising empty the rest. This is probably the time when it is easiest for a passenger to hail a cab. 40 percent of a typical day's cab rides are taken in the six-hour period between 6 p.m. and midnight, which makes that period 166 percent more efficient than the rest of the day.

Cruising Vs. Paid Miles

When considering taxi usage, it's important to distinguish between "paid" miles (i.e., when a passenger is inside a cab) and "cruising miles". In our sample of over 5,000 trips, the average cruising distance between trips was 2.87 miles, although this figure also includes the first and last 'cruises' of the day, to and from the fleet garage (Figure EF7). The average paid trip was 3.7 miles, as noted above. Applying these rates to the estimated 172 million trips made in 2005, with a fuel efficiency of 12 to 14 miles per gallon (Schenkman, March 2006), comes to 86.7 million gallons of gasoline consumed by taxis each year, 38 million of which were burned cruising for passengers.

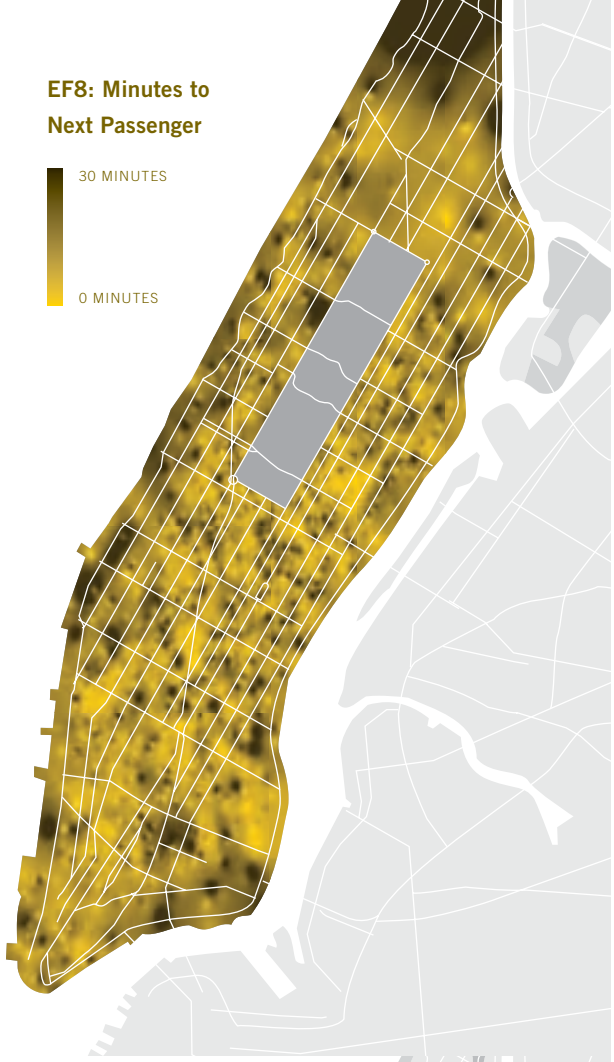
Figures EF6 and EF7 show the average distance cruised each hour and the percent of a driver's hour that is spent looking for a fare. The worst period is between 6 and 10 a.m., when the cab is cruising between 55 percent and 65 percent of the time (Figure EF6). Fleet cabs are contracted from 5 a.m. to 5 p.m., so day-shift fleet drivers who want to work the busier and more lucrative parts of the day must pay the lease fee for the entire shift. Having nothing to lose but gas money, and

"[It may seem puzzling that there's] cruising in the morning, but it's because of the one-way nature of commuting into the Central Business District (CBD). Drivers return to the Upper East and Upper West Sides empty after dropping off downtown, where there are few pickups in the morning rush. On the Upper East Side, some passengers will walk to an uptown avenue to catch a cab [then direct it back] downtown."
Bruce Schaller, Schaller Consulting

EF8: Minutes to Next Passenger

30 MINUTES

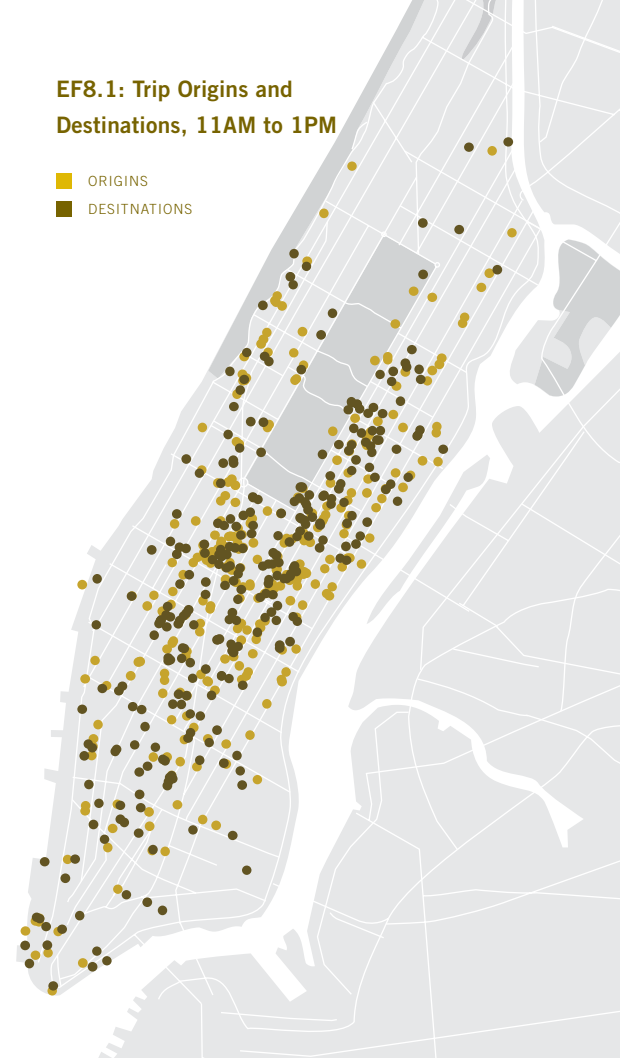
0 MINUTES



EF8.1: Trip Origins and Destinations, 11AM to 1PM

ORIGINS

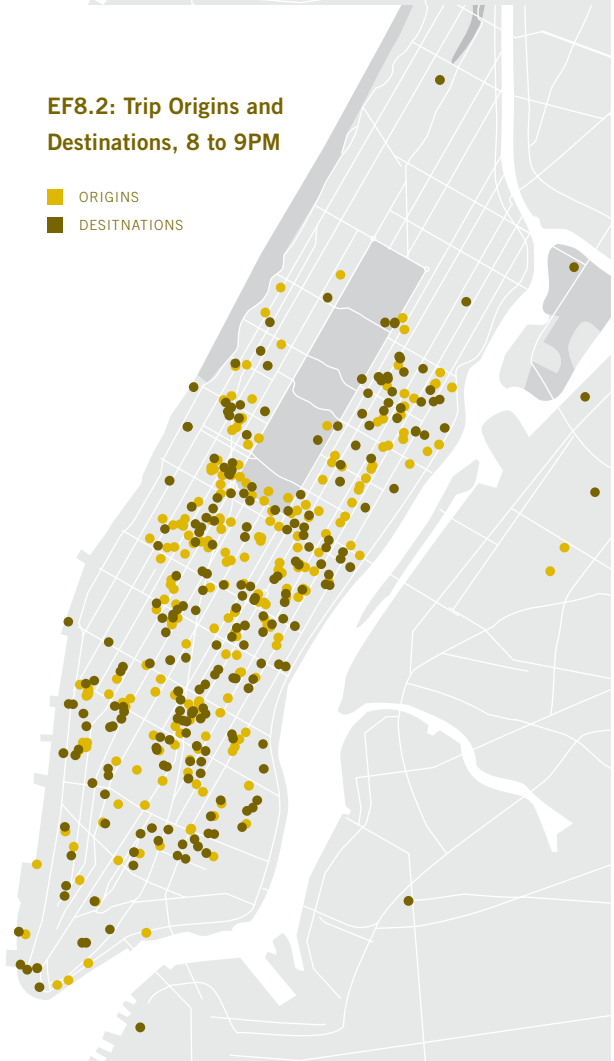
DESITNATIONS



EF8.2: Trip Origins and Destinations, 8 to 9PM

ORIGINS

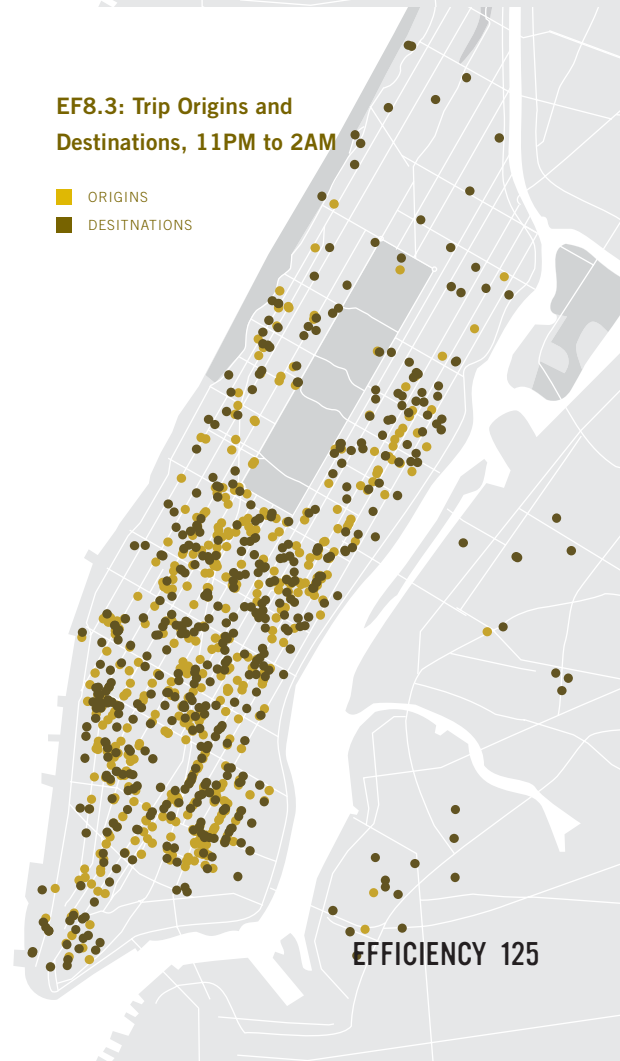
DESITNATIONS



EF8.3: Trip Origins and Destinations, 11PM to 2AM

ORIGINS

DESITNATIONS



just a gallon or two at that, the driver might as well try to pick up a few fares early in the morning to help cover the lease cost. While a gallon or two may not seem like much to each individual driver, averaged across 13,000 cabs, assuming that only 60 percent are on the street at any given time, the fleet could easily consume over 15,000 gallons every day, just cruising the early-morning hours.

Airport Trips

The period of lowest demand corresponds with the time period in which the longest distance trips are made. Only 3 percent of the day's trips are made between 4 and 6 a.m. but almost 20 percent of those trips are made to the airports, compared with 5 percent throughout the day.

Overall, however, cabs make surprisingly few trips to NYC airports. The drivers in our sample went to LaGuardia with a passenger on only 3 percent of their trips but the passengers they picked up there accounted for 11 percent of their rides.The reverse is true at JFK; cabs were only 0.6 times as likely to pick up a passenger at JFK as they were to drop one off there. This suggests that cabs in the vicinity of LaGuardia go there to get a fare back to Manhattan but cabs who have dropped off at JFK will deadhead back a good deal of the time.

Trips to the airports occur at very specific times of the day. Between 6 and 7 a.m., 33 percent of taxi trips in the sample were destined for LaGuardia (Figure EF10), while trips from LaGuardia were more evenly dispersed throughout the day (Figure EF11). Far fewer trips are made to JFK.

HOW DOES REGULATION INFLUENCE CAB EFFICIENCY?

Both the number of medallion taxis and the level of fare are set by City regulators. There are good reasons for these constraints, including the finite space on city streets and the risk of price gouging for unwary passengers. The price of these regulations, however, is to some extent paid in efficiency.

While Starbucks can schedule most workers for the morning rush and airlines can increase prices for Thanksgiving travel, the yellow-cab industry does not enjoy this flexibility. In fact, TLC rules dictate that corporate (or 'fleet') medallions must be double-shifted and on the road 24/7. Not only is there a perceived undersupply during peak hours, but taxi service is also oversupplied during off-peak times.

TLC regulation intended to professionalize yellow-cab drivers, such as increased training requirements, may also have had an impact on efficiency. Fewer numbers of part-time drivers have led to a less flexible labor force, and a lack of drivers available to ramp up supply during peak hours.

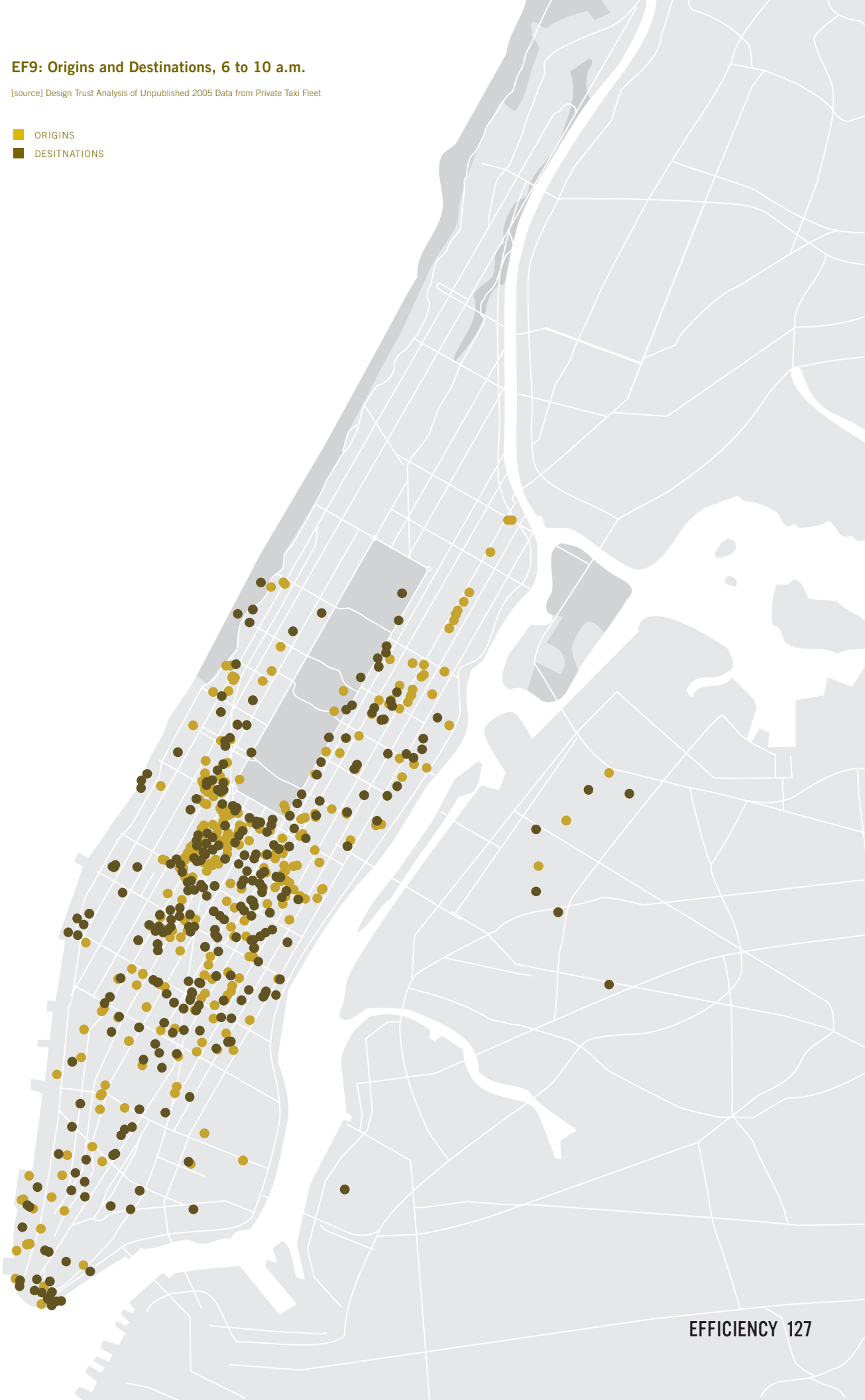
New York's large for-hire vehicle sector is less tightly regulated; while this has some serious consequences for service quality and consistency, car services are largely responsible for the outer boroughs enjoying good service availability. In cities with just a single type of point-to-point vehicle service, by contrast, drivers tend to congregate in the highest demand areas and outlying neighborhoods get short shrift.

The TLC has avoided this efficiency problem by maintaining multiple types of regulated vehicle service, from medallion cabs to black cars, livery services, and commuter vans.

EF9: Origins and Destinations, 6 to 10 a.m.

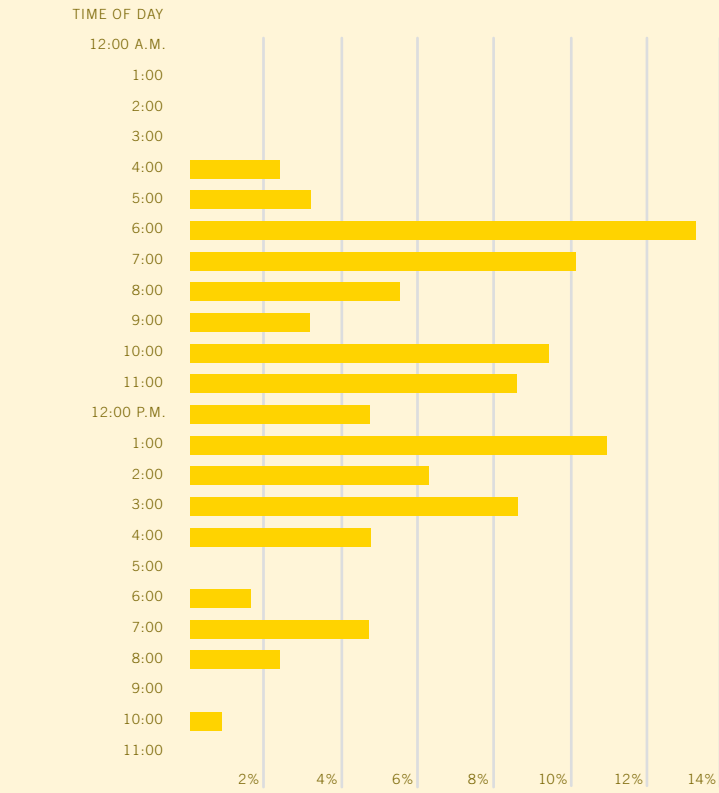
[source] Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

ORIGINS
DESITNATIONS



EF10: Trips to LaGuardia Airport

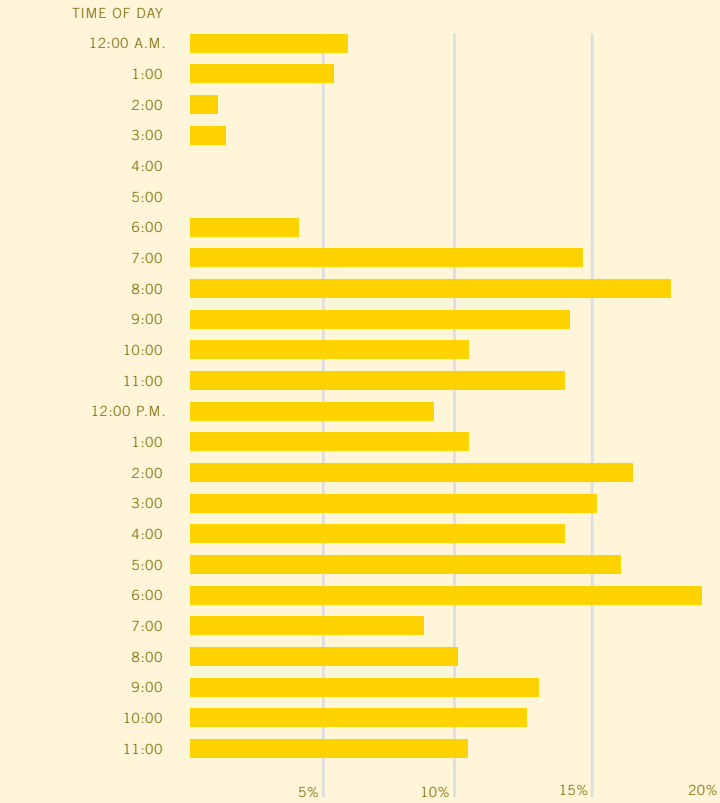
Distribution of all trips to LaGuardia by time of day



Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

EF11: Trips Originating at La Guardia Airport

Trips coming from LGA are more dispersed throughout the day



Design Trust Analysis of Unpublished 2005 Data from Private Taxi Fleet

STRATEGIES

The strategies below suggest how the TLC could influence the efficient matching of taxi services supply with passenger demand. Even more than the strategies presented for usability, economic value, and sustainability, these efficiency initiatives rely on the collection and monitoring of electronic trip data, as described in the introduction to this third part of the book.

Note that to balance supply and demand these strategies are separate from the broader question of the overall number of medallion cabs required to meet demand. Even if more cabs were to be authorized, some of these measures would still be necessary to prevent temporal and spatial imbalances in cab services.

PROMOTE FLEXIBILITY IN CAB SUPPLIES

A key cause of the mismatch between supply and demand is the rise of double-shifting for yellow medallion cabs. Double-shifting is the practice of leasing a cab to two or more drivers per day, and it results in more cabs on the road at off-peak times—exacerbating oversupply at these times of day. The costs of oversupply are borne by drivers (in the form of lowered fare revenue) and by medallion owners as a whole (in the form of lowered lease payments or unfilled shifts).

The rise of double-shifting is a direct consequence of changes in the economic structure of the industry, such as the lease-cap system, as well as TLC requirements that owners of corporate medallions double-shift. TLC could consider incentives that would tip the balance back toward single-shifting.

While the majority of cabs are double-shifted, the practice is by no means universal, according to Design Trust interviews. “It’s a very individual choice. Some [owner-drivers] don’t want anyone else driving their car,” points out one owner. Double-shifting is also “not totally free money because the insurance premium and the wear and tear on a vehicle go up quite a bit for a second driver. It also limits their own working time.”

Create Incentives for Single-Shifting

TLC should monitor trip-sheet information to assess the supply of cabs at off-peak times. If indicators suggest that cabs are oversupplied at off-peak times, TLC could explore incentives for single-shifting of cabs, such as a rule change to increase

the lease-cap differential. TLC already differentiates between peak- and off-peak times in its lease caps. However, the range between different shifts is less than 15 percent, from a low of $105 for morning shifts to $129 for Thursday, Friday, and Saturday nights. TLC could consider reducing the cap at low-demand periods, as identified by benchmark monitoring, coupled with an increase at high-demand periods so the overall effect is revenue neutral. This would encourage some owners to withdraw their cabs from the market at periods when indicators suggest there is reduced passenger demand. In addition, TLC could consider restricting new medallions to a single shift. [23] The best way to enforce this restriction would be to permit only the owner to drive these medallions. While there is no guarantee that drivers would choose to drive at times of peak demand, it's likely the majority would follow the most lucrative schedule. Ongoing TLC benchmarking efforts would be required to track results of any such restrictions on peak supply.

One possible model for these new medallions is the "Ambassador" course introduced in Toronto in 1998. [24] Toronto's program offers a non-transferable license with an annual fee payable to the City. Apart from augmenting supply at the busiest times, a license-based system in New York would provide a low-cost alternative to ownership for drivers who want to gain a stake in the industry. [25] In exchange for lowering the cost barrier to entry, the TLC could set eligibility requirements that would encourage high levels of customer service, such as a minimum period of experience (e.g. five years), a clean driving and administrative record with TLC, and advanced driver-training courses.

Promote Part-Time Driving

In addition to single-shifting, the TLC could look for ways to promote permanent part-time driving (as opposed to the intermittent part-time driving that is now more common). One factor that contributes to the increasing difficulty in participating as a part-time worker in the modern taxi economy is the training and financial commitment required to become a driver—at least four days and $300 in fees. Finding ways to restructure driving requirements to bring more long-term part-time workers into the industry will help ensure that there are more and better-driven cabs on the road when they are needed—and fewer when fewer are called for.

INCREASE CAB AVAILABILITY IN HIGH-DEMAND PERIODS

Offer Driver Incentives

The difficulty in getting a yellow taxi in the outer boroughs has been a recurring complaint of New Yorkers over the years. While less dense areas will always rely primarily on the for-hire vehicle sector, it makes sense to provide incentives for yellow-cab drivers to serve these markets. Such incentives could help reduce incidences of drivers refusing passengers traveling to outer boroughs, as they would have a greater chance of a return fare.

The pilot taxi stand program initiated by the Metropolitan Taxicab Board of Trade, a medallion-owners organization, is an example of how driver incentives can work. A taxi stand in Flushing, Queens (located at the No. 7 Subway station on Main Street and Roosevelt Avenue), is staffed by a dispatcher, who provides drivers patronizing the stand with a "shorty ticket" for passenger pick-up at JFK. This pass enables drivers to skip a long wait in the airport holding lot, equivalent to a time savings worth about $25.

23 An alternative would be peak-time medallions, valid only at designated times of day. Peak-time medallions are used in Las Vegas and Perth, Australia. However, administrative and enforcement complexities make them a less-than-ideal alternative – single-shifted medallions provide a simpler solution.

24 For more information, see http://www.toronto.ca/taxitraining/

25 Drivers may not find the reduced cost of entry for an Ambassador-style system a fair trade for the potential equity offered by a traditional medallion. Wim Faber suggests that some Toronto drivers felt Ambassador plates offered "no proper stake in the industry, as they had no value, did not increase in value, and could not be sold."

"Double-shifted medallions serve the public night and day, reflecting the 24-hour operations of this city. They also provide steady work to the significant portion of drivers who rely on fleets, as they cannot purchase their own medallion or vehicle and prefer to benefit from the "all-inclusive" arrangement that only fleets can offer. There is an argument to be made that in issuing new medallions, more individual, single-shifted medallions should be auctioned than double-shifted corporate medallions—that is more about encouraging economic opportunities for individuals than anything else. But restricting any new medallions to a single shift goes too far."
Metropolitan Taxicab Board of Trade

"IF THE CITY SOMEHOW EVENED OUT THE MONEY [FOR DRIVERS] FOR RIDES OUT OF MANHATTAN, THAT WOULD REALLY HELP THOSE OF US IN THE OUTER BOROUGHS."
TAXI PASSENGER, DESIGN TRUST SURVEY

Other incentives for outer-borough service should be identified, along with funding sources—currently the TLC does not run stands, nor does it fund incentives. The TLC could look to community organizations, Business Improvement Districts, and other neighborhood groups for both information and funding partnerships. Franchise arrangements could also be explored. Any implementation of incentives should also be clearly linked to indicators related to outer-borough service standards, and those indicators should be monitored to assess the extent to which any new programs are increasing the number of yellow cabs serving outer-borough markets.

Provide Real-Time Traffic Information

The installation of GPS equipment in all yellow cabs will provide an invaluable new source of real-time data on traffic conditions. In principle, it should be possible to derive real-time information about travel speeds on any street used by yellow cabs. In turn, this information can be valuable to drivers in helping them avoid congested spots—for example, due to an event or accident—reducing cab "clotting" and evening out supply.

Such data will undoubtedly have broad commercial use. For this reason, the passenger information monitor vendors are probably best suited to implement any such application on a commercial basis. However, TLC could facilitate this process and ensure that the products are made available as needed to drivers.

"The WIHUP (Taxi 60160) radio circuit in Vienna, Austria, supplies traffic data from its GPS-based dispatching system to the local Vienna traffic information system and gets paid for doing that."
Wim Faber, Transportation Journalist

IMPROVE MATCHING OF CAB SUPPLY WITH PASSENGER DEMAND

Designate Additional Group-Ride Locations

Group rides have some of the greatest potential of all efficiency measures, providing more income to drivers, shorter waits and lower fares to passengers, and lower emissions and traffic congestion. TLC has already facilitated group rides at several locations, such as from 79th Street and York Avenue to Wall Street. While a lower per-passenger fare applies, drivers still earn more per trip (see the Economic Value section, above, for further discussion of group-ride fares).

TLC could seek to expand this program. Good candidates for group-ride corridors include locations with high volumes of potential passengers, coupled with insufficient transit service. Based on trip-sheet analysis and interviewee suggestions, the following are recommended for initial trials of group-ride locations: Yankee and Shea stadiums at game time; 181st Street in Manhattan's Washington Heights; Queens and Northern Boulevards in Queens; Clinton Street, DeKalb Avenue, and Flatbush Avenue, as well as central Williamsburg, in Brooklyn; and Staten Island routes serving traffic coming in to Manhattan in the morning.

TLC could work with the NYC Department of Transportation (DOT) to formalize the group-ride locations through street-design changes. These might include indicating taxi pick-up locations with painted or signed loading bays marked for specific destinations. If successful, permanent and consistent taxi-stand installations could be explored.

"IT'D BE NICE IF THERE WAS SOME WAY AT A CAB STAND TO CONNECT RIDERS WHO MIGHT WANT TO SHARE A CAB GOING TO THE SAME DESTINATION."
TAXI PASSENGER, DESIGN TRUST SURVEY

Install Additional Taxi Stands

Taxi stands can be a useful way of matching supply and demand, and reducing the extent of cruising by cabs. In general, taxi stands are not appropriate on most streets—it is more efficient for cabs to stop where needed. However, stands do make sense at major trip generators (particularly transit hubs), at locations where TLC wishes to promote group rides, and in the outer boroughs.

TLC and DOT could identify appropriate locations for new taxi stands. In particular, taxis should be considered during the planning stages of major new developments likely to generate significant taxi demand, so that the street can be configured accordingly.

Taxi stands have great potential to add to the urban design qualities of city streets. The City of New York has launched a coordinated street-furniture program that will standardize and maintain bus shelters, newsstands, and public toilets, funded through a franchise arrangement. Any future taxi-stand program could be modeled on this initiative.

Educate Passengers About Cab Supply

Through experience, the public acquires 'soft knowledge' about the best and worst locations to catch a cab. Efforts should be made to bolster those perceptions through maps and other easy-to-use information sources. For example, if additional group-ride locations and taxi stands are implemented, the TLC should publish a map of these locations. That map could be printed or made available for download from the TLC website. Either medium could support commercial advertisements to offset development costs.

As benchmarking efforts reveal ever more information about the location and supply of cab services, TLC should also make that hard information available as a supplement to cab riders' intuitive knowledge. Information about variables across neighborhoods, times of day, and seasons would be particularly valuable. The TLC website could become a resource for a user-friendly version of aggregated and visualized data about cab availability. GPS technologies will continue to advance, and TLC may soon be able to explore a range of options for real-time representation of taxi information, such as live mapping of empty, on-duty vehicles.

Further Integrate Taxis with Mass Transit

Taxis and transit should be seen as natural complements, part of a comprehensive

package of alternatives that can compete with the private car. Integrating taxis and transit as closely as possible can reinforce this synergy. Passengers can be encouraged to take transit for the longer-distance segment of a journey, before switching to a cab for the "last mile" to a destination that may not be within walking distance.

In most cases, this integration already functions extremely well. There are large taxi stands, in some cases staffed with dispatchers, at major hubs such as Penn Station. In other cases, the integration functions informally, as passengers hail a cab when emerging from the subway.

MTA, DOT, and TLC should work together to develop closer integration. [26] Initial focus should be on high-ridership subway stations where it is difficult to hail a cab—particularly late at night. Simple measures should include provision of taxi information in subway stations, as well as distribution of telephone numbers for local car services. Where a taxi stand exists, standardized signage should direct passengers to the stand. MTA and TLC could also pilot the installation of dedicated telephones for car services at key stations, allowing passengers to wait within sight of the station agent. Ideal candidate stations for a pilot program would have limited street hail and high rider volumes.

26 London provides some of the best examples of seamless coordination between transit and taxis, particularly on the physical level. Transport for London's Best Practice Guidelines may serve as a model for New York City; it covers areas such as amenities, consistent signage, staffing and management, and the physical design of taxi stands at major trip generators. For more, see Transport for London's 2003 publication, Taxi Ranks at Major Interchanges: Best Practice Guidelines, available at: http://www.tfl.gov.uk/pdfdocs/taxi-best-practices.pdf.

"SUBWAY STATIONS SHOULD GIVE A READ-OUT OF THE ANTICIPATED TIME TO THE NEXT TRAIN SO THAT IF IT WILL BE A VERY LONG TIME, I WOULD KNOW TO TAKE A CAB!"
TAXI PASSENGER, DESIGN TRUST SURVEY

In the longer term, TLC and MTA may wish to explore additional integration with transit. While the benefits here are more uncertain and implementation would be challenging, two possibilities that have met with success elsewhere include:

- **Replacing Low-Demand Bus Routes with Taxis:** In some cases, the MTA may need to provide bus service to a community, but low passenger volumes may make shared taxis a better choice than traditional buses—at least at certain times of days. Many German and Austrian cities use shared taxis to replace transit services at night and in sparsely populated areas (Peterson, 1995). Other examples come from Portland, OR; Quebec, Canada; and Rouen, France.
- **Fare Integration:** The next-generation Metrocard, like the "Tap and Go" MasterCard being piloted on the Lexington Avenue No. 6 line, may support additional functions. A single card could allow customers to pay for both a taxi ride and a subway trip—as well as a sandwich or newspaper in the station. The current technology raises some key issues, including how to allow for tips and whether to provide a discount for linked transit/taxi trips.

SUSTAINABILITY

By virtue of its density, New York City is among the most environmentally efficient of the world's cities. However, as a December 2006 report from the Mayor's Sustainability Advisory Board noted, the city continues to face serious environmental challenges: "ozone levels are too high and soot levels are 27 percent above national requirements in parts of the city"—conditions that contribute to "child asthma hospitalization rates [that] are more than twice the national average." Local and global climate change is also expected to have negative impacts. The City of New York has made a commitment to address these concerns by 2030, with current plans calling for New York to achieve the cleanest air of any American city and to reduce emissions that contribute to global warming by 30 percent (City of New York, 2006).

Are the city's taxis part of the problem or part of the solution? On the plus side, taxis are some of the most efficient vehicles on the road in terms of moving people per mile driven, and they reduce the need for private car ownership. The cab fleet itself is also diversifying and becoming greener; a May 2007 Mayoral Mandate requires that by 2012, all taxis must be hybrid-electric. On the other hand, the current fleet of yellow cabs chugs out nearly four tons of pollution a day, [27] some materials used in cabs are harmful, and most obsolete cab components are not recyclable or reusable. Concerns over dependence on foreign oil, greenhouse gas emissions, and future oil prices add to the pressing nature of this issue. More locally, the impact of rising fuel prices on driver income makes a more environmentally efficient cab fleet a crucial interest for the industry itself.

27 Urbitran's 2004 environmental-impact report uses an emission factor for taxis of 1.55 grams per mile, including VOC, PM10 and NOx but not carbon dioxide. According to Schaller's 2006 New York City Taxicab Fact Book, the medallion cabs traveled 811 million miles in 2005.

Ideally, the taxi system should be environmentally sustainable; it should, in one common definition, meet the needs of the present generation without compromising the ability of future generations to meet their own needs. [28] To achieve that standard, a sustainable taxi system would have to address the full range of its various stakeholders' requirements:

28 "Report of the World Commission on Environment and Development." United Nations General Assembly Resolution 42/187 (1987).

Owners of vehicles, medallions, and garages should have access to greener taxis that are not necessarily more expensive to purchase or maintain.

Drivers should benefit from a work environment that is free of potentially harmful fumes and materials.

Passengers should have access to a point-to-point transportation service that does not require them to also accept ongoing pollution of their and their families' environment.

The City, especially residents and visitors that do not use the taxi system, should feel the environmental impact of taxis as little as possible.

As the regulator of the city's taxi system, the New York City Taxi & Limousine Commission has influence over the environmental impact of the city's cabs. This section outlines the environmental impacts of the taxi and describes current and possible future scenarios for more sustainable taxi service. It then proposes opportunities for the TLC to support a more environmentally efficient system, through both direct regulatory action and outreach efforts to the public, the auto industry, and other regulators.

BACKGROUND & ASSESSMENT

THE ENVIRONMENTAL IMPACT OF TAXI SERVICES

"Do you want to walk, or do you have time to take a taxi?" runs the old New York adage. This quip highlights not only congestion, but also the propensity of medallion taxis to substitute for trips by walking or mass transit. In much of Manhattan, cabs may replace more trips on foot than they do trips by car—leading to an increase in total emissions and traffic congestion. In the outer boroughs, by contrast, reliable cab service can provide transportation flexibility to households farther from the city's walkable core, allowing them to live without a car and reducing congestion.

On aggregate, then, are cabs good or bad for the environment? Certainly, any increase in medallion numbers needs to go through an environmental-assessment process that seeks to determine their impact. (Since their numbers are not regulated, for-hire vehicles may face no such expansion constraints.) The 2004 Environmental Impact Statement (EIS) evaluated the impact of no more than 900 new medallions (Urbitran, 2004). As a result three auctions in 2006 resulted in 308 new, limited-purpose medallions (254 alternative-fuel and 54 wheelchair-accessible vehicles).

However, the impact of taxis on the environment remains complex. Is the direct effect of adding more cabs to congested Manhattan streets outweighed by enabling New Yorkers to live without a car? Put another way, are taxis substituting more for private car trips, or mostly for mass transit, walking, and biking? How many parking spaces does each taxi replace? Figure SU1 shows some of the environmental pros and cons.

SU1: Environmental Pros and Cons of Taxis

Environmental Downside to Taxis	Environmental Upside to Taxis
Cause more pollution and congestion on a per-trip basis	Reduce car ownership
Subsitute for transit, walking and bicycling	Reduce need for parking, allowing New York to be more transit focused
	Potential for fuel efficient vehicles
	Provide "mobility insurance" allowing New Yorkers to commute by transit

How Taxis Pollute

Since taxis are often in continuous use, their emissions from "cold starts" are minimal. Taxis also help to reduce car use by allowing households to live car-free. But even if taxis replaced every private car trip in the city on a 1:1 basis, with no substitution from transit, walking, or biking, they would still increase overall emissions and energy use, at least when calculating on a direct basis. The problem is that most taxi vehicles, including the current workhorse of the yellow-cab fleet, the Ford Crown Victoria, are large and not particularly fuel-efficient. Factoring in "cruising" mileage—vacant cabs driving around in search of passengers—further depletes taxi fuel efficiency (also see the Efficiency section, above).

"THE AIR IN NEW YORK IS BAD AND AFFECTING PEOPLE'S HEALTH—THIS MUST BE ACTED ON IN SUBSTANTIVE WAYS."
TAXI PASSENGER, DESIGN TRUST SURVEY

Of course, the equation would change were the Crown Victoria no longer the standard taxi vehicle. The TLC is making great strides in cleaning up the yellow-cab fleet through rigorous vehicle inspections and the issue of 254 medallions for use only on clean-air, alternative-fuel vehicles, including hybrids; three dozen 'standard' medallions are now also in use on hybrid vehicles. A fleet composed of Ford Escape hybrids would generate about the same emissions per mile as the average private car—even factoring in "dead mileage" from cruising. [29] Only on reaching this milestone could taxis begin to be seen as a genuinely energy-efficient transit mode. In addition to issues of energy efficiency, various substances and materials used in the manufacture of auto interiors are potentially harmful to people upon exposure or harmful to the environment over time (Ecology Center, 2006). It should be noted that the following materials are common to most cars and trucks, rather than specific to New York City cabs.

- Polyurethane foams, flooring, carpet, and fabrics can contain PBDEs (Polybrominated diphenyl ethers, flame-retardants associated with several serious health concerns) that give off toxic vapors, recognizable as 'new car smell'.
- Vinyl and PVC dash and instrument panels can contain non-recyclable phthalates that also give off harmful gases.
- Seating textiles, adhesives, and plastics can contain carcinogenic formaldehyde.
- Paint can contain high levels of environmentally polluting VOC (Volatile Organic Compounds).

While these materials meet current standards, there are better options. The TLC is aware that harmful emissions are not only generated from the tailpipe, but also from unhealthy materials used in vehicle interiors. They have raised their concerns with auto manufacturers and intend to continue their ongoing dialogue with the industry to find non-toxic alternatives. Currently only Toyota, Volvo, and Mitsubishi have responded to public demand by using bioplastics in vehicles; of those three manufacturers, only Toyota has vehicles approved for taxi use in New York City.

29 The Escape Hybrid is rated at 31 mpg for city driving – equivalent to 18.6 revenue miles per gallon when cruising is factored in. The average light vehicle obtained 21 mpg in 2006, according to EPA.

SIDEBAR: ENVIRONMENTAL FIELD GUIDE TO COMMON NYC YELLOW CABS

More than a dozen different vehicle models make up the yellow-cab fleet, but only five models are on the road in significant numbers:

Ford Crown Victoria

The majority of the fleet today is made up of eighteen-foot-long, two-ton Ford Crown Victorias, authorized to carry four passengers. Over eleven thousand are in service, and some 56 percent fail initial annual inspection by the TLC. They have a fuel-efficiency of 12 to 14 mpg and meet the least stringent of the California Air Resources Board (CARB) standards, qualifying as a Low Emissions Vehicle (LEV).

Ford Escape SUV Hybrid

Some 323 hybrid Ford Escapes are on the road, making them the most common hybrid taxi model. At 36 mpg, the EPA rating of a front-wheel-drive Escape Hybrid is twice the rating of a Ford Crown Victoria.

Modified Ford Freestar

There are 81 wheelchair-accessible medallions, some of which are affixed to Ford Freestar minivans that have been modified to be wheelchair accessible at the rear. Like the Crown Vic, its fuel-efficiency is around 15 to 21 mpg (2007, US EPA) and it only reaches the LEV-emissions standard. In addition, the manufacturer warranty covers only original components, not modified parts; the adaptations are not compliant with federal mobility guidelines; and the car does not test well—its brakes, sub-frame, and suspension commonly fail inspections. In part because of concerns about the Freestar, the TLC passed a new accessible vehicle specification in June 2006. Under the revised guidelines, the only approved accessible vehicles are manufacturer-supported, side-entry Chevy Uplander minivan, an Ultra-Low Emissions Vehicle II (ULEV-II) with an EPA rating of 16 to 23 mpg, and the Dodge Grand Caravan (EPA rating of 18 mpg).

Toyota Highlander SUV Hybrid

Some 70 Highlanders are in service. These Toyota hybrids are Tier 2 emissions vehicles, also known as SULEV II.

Toyota Sienna

In 2004, nearly 400 Toyota Sienna minivans were introduced to the taxi fleet. By early 2006, there were 1,345 on the road, 9 percent of the total fleet. Only 26 percent fail initial inspection. The Sienna meets the Ultra-Low Emissions Vehicle II (ULEV-II) emissions standard, though their fuel-efficiency is only marginally better than the Crown Victoria, at 17 to 24 mpg (2007, US EPA).

How Taxis Discourage Driving

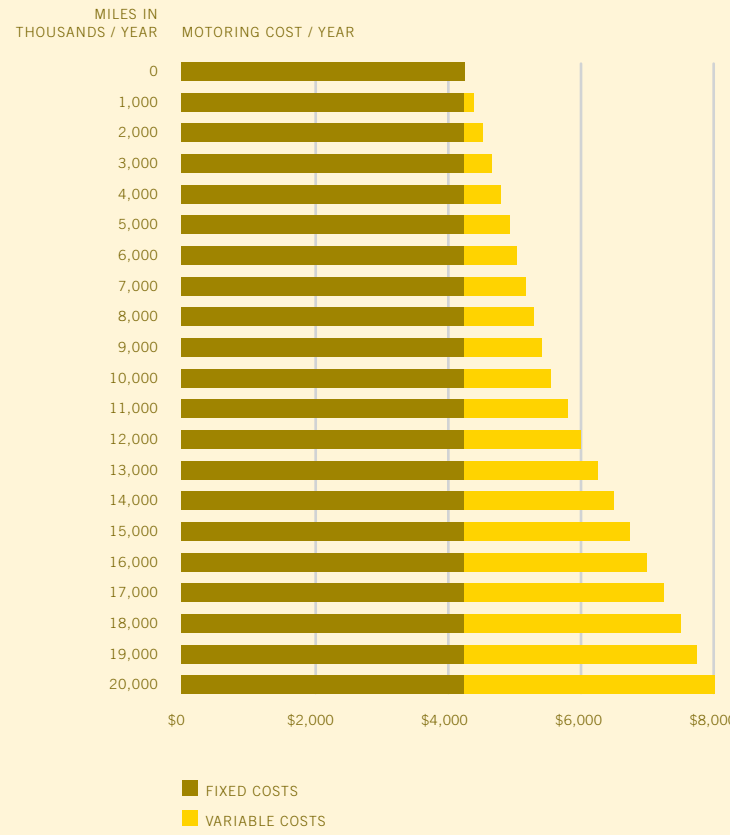
Fixed costs—car payments, insurance, residential parking, and taxes—account for the vast majority of car expenses for most vehicle owners. Once a household decides to own a car, these costs are "sunk" and therefore are typically ignored when an individual decides whether to make a specific trip by transit, on foot, or by driving. Usually only variable costs—gas, tolls, time, and parking—are factored in.

Taxis, along with other alternatives to car ownership like car-sharing—Zipcar and similar services, for example—convert fixed costs into variable costs, which are highly visible to passengers. 30 In other words, taxi passengers are far more conscious of the costs of each car trip, compared to those using their own cars. Figure SU2 shows the fixed and variable costs of a typical car. An average 2.8-mile yellow-cab trip costs $3.69 per mile (Schaller, 2006), compared to just 13 cents in variable motoring costs, excluding parking and tolls. However, if a household can give up a car, the combination of taxi fares, transit passes, and car-share or rental cars may still be cheaper overall, once the fixed costs of car ownership are factored in.

Taxis also discourage driving in more subtle ways. Many workers may need a car during the day for client meetings or other business workers; taxis obviate the need for them to drive to work. Finally, taxis provide a form of "mobility insurance"—allowing people to take the subway, bike, or walk to work, safe in the knowledge that they have access to a car for unexpected emergencies, like collecting a sick child.

30 This discussion is partly adapted from Adam Millard-Ball et al.'s Car-Sharing: Where and How it Succeeds. While the original discussion relates to car-sharing programs (e.g. Zipcar in New York/New Jersey), the same concepts apply equally to taxis.

SU2: Costs of Vehicle Ownership



Figures are for a small car (e.g. Ford Focus, Honda Civic) and exclude parking and tolls. (AAA, 2006)

SIDEBAR: TAXIS AND PARKING

Taxis allow New York to prosper without large supplies of parking. While a taxi trip may generate as much or more congestion and pollution than the same trip by private car, the taxi journey does not require parking. [31] A typical parking space occupies 325 square feet including aisles and ramps—meaning that most car-commuting office workers have more space for their auto than their cubicle, or even their studio apartment.

New York City's high population density makes possible the level of transit (and taxi) service to which New Yorkers have become accustomed, and density enables them to access shops and services on foot. As Jane Jacobs wrote in 1961 in *The Death and Life of Great American Cities*, "The main purpose of downtown streets is transaction, and this function can be swamped by the torrent of machine circulation. The more downtown is broken up and interspersed with parking lots and garages, the duller and deader it becomes in appearance, and there is nothing more repellant than a dead downtown."

New York's Central Business District has fewer than 24 parking spaces per acre, and 0.06 per job—the lowest of any American metropolis. San Francisco has 41 per acre and 0.14 per job. Boston has 34 per acre and 0.62 per job (Newman & Kenworth, cited in Shoup, 2006). These remarkable New York figures are mostly due to mass transit, but taxis also play an important role.

31 Of course, taxis do need parking spaces—at garages, in airport holding lots, at rest stands, and so on. However, these can be sited away from main hubs where the priority is to maximize development; many taxis are also in service around the clock.

"I FEEL LIKE A JERK SITTING AS A LONE PASSENGER IN A GAS-GUZZLING, 3,500-POUND CAR. I'D RATHER RIDE IN A MORE EFFICIENT VEHICLE—WE ALL HAVE TO SHARE THE SAME CITY, AND IT'S JUST ONE PLANET."

TAXI PASSENGER, DESIGN TRUST SURVEY

EMBRACING CHANGE: SUSTAINABLE TAXIS NOW

The TLC's original incentive for introducing hybrid vehicles to the taxi fleet was to improve air quality and to allow drivers to make more money at a time of very high fuel prices. Stringent vehicle inspections were motivated by a 1970's lawsuit against the City for violation of the Clean Air Act, as well as by a desire to improve overall city air quality. While reducing air pollution remains a key reason to diversify the fleet in favor of cleaner vehicles, there are other reasons that the time is right for a more sustainable taxi system:

Gas prices are increasing.
Drivers of conventional cabs are now paying up to $50 a shift to fill a tank. In comparison, hybrid drivers report savings of $10 to $30 per shift depending on the hybrid model they drive.

SU3: Comparison of Conventional and Hybrid Fuel Costs

	Crown Victoria	Hybrid SUV
Avg. Miles Driven / Year	60,000	60,000
Miles Per Gallon (2007, US EPA)	15–23	29–48
Current Gas Price	$2.99	$2.99
Avg. Gas Cost / Year	$11,960–$7,800	$6,186–$3,738
Avg. Savings / Year		$4,062–$5,774

The 'debate' about climate change is over.
Most policy-makers are committed to finding viable alternatives to fossil fuels to improve air quality, diversify our energy options, and reduce greenhouse-gas emissions.

Innovation in the energy and automotive industries is advancing.
Extensive research continues into creating viable alternative-fueled vehicles, from partial or zero-emissions gas-powered cars, to hybrid, electric, plug-in hybrid, hydraulic hybrid, propane, and even hydrogen-fueled cars. 32

Mainstream opinion is shifting.
The public and the taxi industry are better informed, due in part to the TLC's public outreach during the 2006 medallion auction. Just before the TLC introduced hybrid medallions, a survey by the Global Strategy Group reported that: "Seven in ten New Yorkers say it is important to make the switch [to hybrid taxis] now, and a majority report that even sacrificing a few inches of legroom or interior space would

32 At the present, few alt-fuel vehicles are affordable and most (with the exception of the hybrid-electrics) have yet to prove their reliability or cost effectiveness when compared to dirtier internal-combustion vehicles. Hybrids, for example, while sipping fuel rather than gulping, still consume gasoline.

make no difference in their support for cleaner-air cabs." Over half of respondents rated air pollution their first reason for doing so (cited in Richard, 2005).

Current New York City Efforts

TLC has taken clear steps to enhance the environmental sustainability of the taxi system. In June 2006, the agency issued 252 "green" taxi medallions—128 individual and 124 fleet medallions—which are dedicated for use on either hybrid or compressed natural gas (CNG) vehicles. In addition, although there are only 281 "green" medallions in total, there are more than 414 hybrid vehicles in service, as some vehicle owners have opted to use "standard" medallions on hybrid or CNG vehicles.

The hybrid medallions have been put into service on a number of vehicle models, with the Ford Escape SUV proving most popular. At 36 mpg, the EPA rating of a front-wheel-drive Escape Hybrid is twice the rating of a Ford Crown Victoria; with an average usage of tens of thousands of miles per year, fuel savings are significant. "They [the drivers] are ecstatic about the [hybrid] Ford Escapes," said one successful medallion bidder. "It's a great vehicle—it's smaller, less aggressive, there's no partition in there. They're making more money and working less, so they're absolutely ecstatic." Indeed, more than a dozen holders of unrestricted medallions have switched to hybrid vehicles, while more than a dozen others have moved to CNG vehicles. In all, more than 30 medallion holders have switched to clean-energy taxis.

Some owners, however, are more cautious, citing uncertainties over longer-term maintenance costs. "It's been proven more than once here that you need a certain type of heavy-duty vehicle to survive city streets, 24/7," says one. Others also have safety concerns, since the current hybrids cannot accommodate a partition. The TLC has approved an L-shaped partition for the smaller hybrid vehicles and it is currently installed in almost 100 so far, with more on the way.

More fundamentally, other owners expressed frustration with changing regulatory priorities. Under the Giuliani administration, a "stretch" version of the Ford Crown Victoria was required, providing customers with six inches of additional legroom. Now, medallion owners believe that the priority is fuel economy—regardless of the impact on passenger comfort. TLC considers passenger comfort and fuel economy/reduced emissions both as important priorities, but when faced with a choice, the environmental issues are deemed more important.

New York State Programs

In addition to TLC efforts to bolster the adoption of hybrid vehicles, a number of New York State programs are also supporting cleaner, quieter, more efficient cabs for New York City. The New York State Energy Research and Development Authority (NYSERDA) administers congestion mitigation air quality (CMAQ) and compressed natural gas (CNG) programs. Under the CMAQ program, NYSERDA provides funding to the City for tax credits and to offset the lower revenues from reduced-price hybrid medallions. NYSERDA's other cab-related program pays $8,000 to dealers to pass on a savings to the customers for each CNG-fueled taxi they sell. As part of an earlier program in the 1990s, almost three hundred city vehicles were CNG-powered—this despite the lack of infrastructure to support CNG. The taxi industry took a proverbial financial bath as the result of the CNG debacle and is hesitant to get bit by another "alternative fuel" bug.

Global Best Practices

Other cities are also exploring environmentally efficient vehicles in attempts to reduce congestion and improve air quality. Mexico's National Institute of Ecology is collaborating on a project with Honda to evaluate the Civic as a taxi option that would reduce gas consumption in Mexico City. The British Consulate in Mexico City even uses electric vehicles. In London, 33 taxi owners are required to invest in less-polluting vehicles, install abatement technology, or convert vehicles to run on alternative fuels—measures that are expected to reduce taxi emissions by up to 50 percent by the end of 2007. Mumbai, India, has almost 40,000 taxis and all run on CNG.

33 Another London program promotes GWiz electric vehicles: The short-range, low-speed, carbon-neutral cars not only do an equivalent of 600 mpg, they can be charged for free within London, and are exempt from road tax, the city's congestion charge, and parking fees. They are a fully deductible business expense, subject to the lowest rate of company car tax, and can be insured at competitively low rates. Used five days a week, the cost savings (on parking and congestion charging, never mind gas) are estimated to average nearly $18,000 (£9,120) a year. See http://www.goingreen.co.uk/ and http://www.worldchanging.com/archives//002515.html.

ENVISIONING A GREENER YELLOW CAB

What would it mean to be a better yellow cab in the context of environmental sustainability? A better yellow cab would be as safe as current cabs, as usable, more profitable, and produce economic, ecological, and social value. Waste and pollution generated throughout the cab's lifecycle would be minimal. By this definition, the city's iconic medallion vehicle would be both eco-effective and eco-efficient. In short, a better yellow cab for New York would be green. The auto manufacturing and energy industries are transforming. As they advance and innovate, there are opportunities to develop cabs that are both more profitable and more sustainable. 34 Alternatives include using different types of vehicles to provide services; fueling those vehicles with different forms of energy; and choosing more efficient, economical, and eco-effective materials and manufacturing processes. An exploration of each of these concepts is found below.

34 A holistic approach to harnessing these opportunities is set out in William McDonough and Michael Braungart's *Cradle to Cradle,* a compelling industrial-design perspective on making and using things both profitably and sustainably. The evaluation here of the cab is drawn from their 'lifecycle assessment' of goods we manufacture and consume. Conclusions here, and the recommendations that follow, also concur with the Hypercar concept and the overall strategies set out in *Natural Capitalism* by Paul Hawken, Amory Lovins, and L. Hunter Lovins. They maintain, like McDonough and Braungart, that profitable industries need a paradigm shift to incorporate natural resources into policy and enterprise. This shift involves four factors: human capital (labor, intelligence, culture, organization); financial capital (cash, investments); manufactured capital (infrastructure, machinery, tools); and, critically, natural capital (resources, living systems).

Alternative Vehicle Types

A greener yellow cab could conserve fuel and reduce greenhouse-gas emissions by being a lighter, smaller, more aerodynamic vehicle with ample room for passengers and luggage/equipment, but reduced trunk space. In addition to compact four-passenger vehicles, two- or even one-passenger models might meet these standards. Some observers have suggested that New Yorkers would object to any cab vehicle that didn't conform to expectations for a passenger sedan. Quick acceptance of minivan cabs seems to debunk that concern. Were cab vehicles to continue to diversify, the riding public would be likely to embrace the change as long as the new vehicles were promoted for their environmental benefits, met usability requirements, and retained the current fleet's iconic yellow color.

"THE FLEET SHOULD BE REPLACED WITH ALTERNATIVE FUEL OR HYBRID CARS."
TAXI PASSENGER, DESIGN TRUST SURVEY

Alternative Fuels and Engine Types

The New York City taxi fleet is on its way to a greener future, as the Mayor's May 2007 initiave requires that all cabs get at least 30 mpg by the year 2012. Cabs are on the road all the time, so there's an even greater imperative to decrease carbon and greenhouse-gas emissions from taxis than from private vehicles. With up to 50 percent of vehicular traffic in Manhattan's Central Business District comprised of yellow cabs at peak hours, the time is now. A greener yellow cab will be signifi-

cantly less polluting by running cleaner and renewable fuels or strictly on a form of alternative energy. Petroleum fuel systems can only be made so efficient (see Figure SU4, below), and other fossil fuels, while presenting promising alternatives, will just extend the problem for another generation. There are many exciting alternative energy sources being presented these days.

SU4: Cab Fuel and Engine Technology

Progress	California Air Resources Board (CARB) Standard	Vehicle Example	Noteworthy
Current	Low Emission Vehicle (LEV)	Ford Crown Victoria	LEV is the least stringent standard for all new cars sold in California after 2004.
	Ultra Low Emission Vehicle (ULEV)	Toyota Sienna	ULEV cars emit 50 percent fewer emissions than the average for new cars released in the same model year (known as the "average new model year vehicle").
	Super Ultra Low Emission Vehicle (SULEV)	Toyota Highlander	SULEVs are 90 percent cleaner than the average new model year vehicle. Only emit a pound of hydrocarbons over 100,000 miles—equivalent to spilling a pint of gasoline.
	Partial Zero Emission Vehicle (PZEV)	Ford Focus and Fusion, Honda Accord, Hyundai, Mazda 3, Nissan Altima, Subaru Legacy, Toyota Camry, Volkswagen Golf and Jetta, Volvo V70	Meets SULEV tailpipe emissions standards, has a fifteen-year, 150,000 mile warranty, and zero evaporative emissions.
Being Developed	Advanced Tech Partial Zero Emission Vehicle (AT-PZEV)	Examples include the 4- cylinder, 21–30 mpg Toyota Camry and the 4-cylinder, 18–26 mpg Honda Accord. Also, plug-in hybrids (under development) or CNG vehicles (2007, US EPA)	Cars that meet the CARB standards for Partial Zero Emissions, with a fifteen-year (or 150,000 mile) emissions-control warranty also meet the TLC rules for hybrid cabs. They are nearly as clean—or cleaner—than hybrids.
Optimal	Zero Emission Vehicle (ZEV)	Electric lithium ion-powered vehicle	No tailpipe emissions, 98 percent cleaner than average new model year vehicle.

Schenkman, September 2006

Alternative Materials and Manufacturing Processes

Sustainable vehicle design extends beyond the engine: a greener yellow cab could be designed, produced, and maintained without toxic, harmful, or polluting materials and processes. Harmful materials and processes would be phased out or substituted over time until eliminated.

"No one has died, but that doesn't mean that this stuff [vehicle materials] is particularly healthy"
Dr. Andrew Dent, Material ConneXion

SIDEBAR: TECHNO-TEXTILES AND NEW MANUFACTURING TECHNIQUES: TOWARDS SUSTAINABLE TAXI MATERIALS

The automotive industry has for many years—in a wide range of vehicles—used a number of materials that may have adverse health effects, such as foams containing PBDE (polybrominated diphenyl ether, a flame-retardant). A new trend in the automotive industry has taken hold as such materials are slowly being replaced with others that have flame-resistant qualities, such as plastics containing polymers.

For more information on the sustainability and toxicity of vehicle materials, visit the Ecology Center (http://www.ecologycenter.org/factsheets/plastichealtheffects.html) and the United States Environmental Protection Agency (http://www.epa.gov/ebtpages/pollutants.html).

Upholstery

- Several options exist for decreasing the potential toxicity of vehicle interiors. Foams containing PBDE (polybrominated diphenyl ether, a flame-retardant with suspected detrimental health effects) can be replaced with foams with no suspected toxins, and coated in naturally flame-resistant materials, such as plastics containing polymers.
- Alternatives are also in development for replacing polyurethane, a highly flammable plastic suspected of toxicity, widely used in vehicle upholstery. Non-toxic options, such as French '3D spacer tiles', are development internationally, and other alternatives are in examination by the US Environmental Protection Agency. (For more information, see http://www.epa.gov/dfe/pubs/flameret/ffr-alt.htm)
- Seats can also be redesigned as non-upholstered bench or jump seats. As most journeys are shorter than 10 minutes, passengers could still be comfortable even without cushioning, and seats would be easier to wipe down too.

Vehicle trim, dash and dials

- Several vehicle components are currently fabricated using phthalate compounds, substances which are added to plastics to increase their flexibility, and under study for suspected disruption of natural hormone levels, especially in children. To avoid potential toxicity, these plastic components can be replaced with natural materials, or with widely available non-toxic plastics. TPOs (thermoplastic polyolephins)and TPEs (thermoplastic elastomers), both of which have the added benefit of being easy to recycle, could be used as plasticizers instead of phthalate compounds. The European auto industry is already using DINP (diisononyl phthalate), another non-toxic plasticizer.
- Towards increasing the sustainability of car interiors, vehicles can be redesigned in larger pieces. If fewer pieces are needed for assembly, there would be less need for potentially toxic glues, and the disassembly, reuse, and recyclability of components would be quick and easy.

Paint

- Taxis are painted their distinctive yellow at the factory, and conventional vehicle spray paint contains many chemicals. Less toxic water-based paint could be used instead of the current industry standard, or, for fiber-composite cars, lay-in-mold color can replace spraying all together.

STRATEGIES

New York City's taxi system should be environmentally sustainable, a goal that may be advanced through the strategies outlined below. In support of these strategies, the TLC could also expand existing good efforts within its Safety and Emissions Unit to track and monitor environmental data, and to adapt policy to trends in vehicle production and energy resources, distribution, and efficiency.

However, any initiatives to increase the sustainability of the taxi system must recognize the many constituencies that influence the environmental impact of the city's cabs. Auto manufacturers largely determine the design and technology of vehicles. Multiple federal, state, and municipal bodies set environmental controls. Materials, service and financial structures, and matters of local custom are the product of a sprawling community of drivers, medallion holders, passengers, and the Taxi & Limousine Commission.

MAINTAIN UP-TO-DATE ENVIRONMENTAL REQUIREMENTS

Options for sustainable cabs are changing rapidly. As ever more eco-efficient vehicles, technologies, and materials come to market, the TLC could continue to pursue even better fuel economy and reduce greenhouse-gas emissions by raising standards in response.

Introduce Fuel-Efficiency and Greenhouse-Gas Standards

The TLC has remained at the forefront of the movement to make the taxi fleet cleaner. By auctioning dedicated 'green' medallions, the agency has catalyzed the introduction of hybrid vehicles into the taxi fleet. These medallions will provide valuable trials of the durability and user acceptance of various hybrid models. The TLC also continues to push for cleaner vehicles through the passage of new rules that will give retirement-age extensions to clean vehicles.

Once sufficient "road test" data from the green medallions are available, TLC should introduce standards for new taxi vehicles that set not only minimum fuel economy, but also maximum greenhouse-gas emissions. Given the three- to five-year age limit on taxi vehicles, the efficiency and emissions levels of the whole fleet could be improved relatively quickly. Fuel savings will offset most, if not all, of the cost of implementing these standards. Indeed, over 100 regular medallions are

"Greenhouse-gas standards [are even better than] fuel-efficiency standards. Fuel efficiency doesn't carry over between different types of fuels; for instance, ethanol vehicles are not as efficient, but have much lower emissions of greenhouse gases."
Yerina Mugica, Natural Resources Defense Council

already being used on hybrid vehicles, and all taxis will be hybrid by 2012 as per the Mayor's May 2007 mandate. "Alternative fuel is the future," one owner told the Design Trust, calling for less dependence on fossil fuels—whether the alternative is electric taxis, hydrogen or compressed natural gas-fueled vehicles, or hybrid technology.

The standards should be raised incrementally based on the availability of proven vehicles that also satisfy comfort and other criteria. TLC should not try to pick "winners" and mandate specific technologies—after all, some current hybrid SUVs perform no better than non-hybrid sedans. Rather, fuel economy and emissions rates should be the deciding factors.

Strengthen Requirements for Hybrid Medallions

Any fuel-economy and greenhouse-gas emissions standards for regular medallions should be coupled with tighter requirements for the restricted hybrid medallions—this is reasonable, given that owners received a discount on the purchase price. 35 For example, depending on the technologies available at the time, vehicles with alternative-fuel medallions could be required to beat the regular fuel economy or emissions standards by 25 percent.

35 However, owners should also be given the option of converting hybrid to regular medallions, on payment of a lump sum to TLC.

EXPLORE NEW SOLUTIONS FOR ENHANCING SUSTAINABILITY

Beyond strengthening standards, the TLC can capitalize on its leadership role by continuing to seek out opportunities to enhance the environmental health of the taxi system and by sharing its findings with the ever-more environmentally aware riding public.

"I WOULD LOVE TO SEE A CAR WITH SMALLER EXTERIOR DIMENSIONS OFFERING MORE INTERIOR VOLUME, WHICH WOULD DECREASE SPACE TAKEN ON CITY STREETS AND ALSO REDUCE FUEL CONSUMPTION."
TAXI PASSENGER, DESIGN TRUST SURVEY

Pilot the Use of Smaller Vehicles

While fuel economy and greenhouse-gas emissions can be improved for all types of vehicles, the greatest gains will involve a tradeoff between environmental goals on one hand, and vehicle size on the other. For some taxi trips, a large vehicle is undoubtedly necessary—airport trips and group rides are the most obvious. For other trips, however, a four-passenger sedan is far bigger than needed. The average taxi ride takes just 1.4 passengers a distance of 2.5 miles (Schaller, 2006).

TLC could therefore pilot a program to allow smaller, less-polluting, more efficient vehicles to be used as medallion taxis and for-hire vehicles. The vehicle design should be distinctive so that passengers on the street can readily distinguish the smaller

cabs and determine whether it meets their needs for a specific trip. Lower fares might be prescribed for these cabs to compensate passengers for the more limited space.

Conduct Life-Cycle Audits of the Taxi System

There is conflicting information on the life-cycle environmental impacts of the materials that are used in cab manufacture. While these materials are in many mainstream vehicles, some in the automotive industry are making a concerted environmental effort to limit potentially hazardous impacts.

The TLC has had a considerable ongoing dialogue with many auto manufacturers and engineers to better understand these effects and what regulatory role, if any, the TLC could play as they continue to monitor progress towards sustainability, possibly using the McDonough Braungart Index of Sustainability [36] or similar measure. Life-cycle audits could serve as the basis for updates of TLC regulations. For example, regulations could require the hack-up process be designed for easy disassembly and reuse or recycling. Currently, the metal portion of the partition is recyclable, but the transparent portion is not. The audit may also suggest replacement of certain materials of concern or the installation of an air-purification system to enhance the overall environment.

The TLC could consider partnering with a research institution to conduct a study that may provide useful information on designing better vehicle interiors and seating.

36 The McDonough Braungart Index of Sustainability is a proprietary benchmarking tool, offered by McDonough Braungart Design Chemistry, that "evaluates a product's materials and processes so that redesign for sustainability can take place. During the process of redesign, the Index can be used to continuously track and monitor progress toward sustainability." See http://www.mbdc.com/ for more information.

ADVOCATE FOR SUSTAINABILITY WITH ALL LEVELS OF TAXI STAKEHOLDERS

In addition to advocating for sustainable processes with local taxi users and owners, the TLC can work closely with other City agencies to find opportunities for joint environmental programs. The TLC can also engage with counterparts in other U.S. cities (and worldwide) to share insights, learn from comparative policy experiences, and engage in more productive exchanges with the auto industry. In the past when the TLC has articulated its interest, sometimes the auto industry has listened (i.e., the stretch Crown Victoria) and sometimes it has not (i.e., accessible vehicles). Regardless, TLC advocacy and outreach can play an important role in encouraging manufacturers to prioritize green vehicle design and production.

Champion Sustainable Materials and Production Processes

TLC could reach out to automakers and federal legislators to indicate support for alternatives to toxic compounds and production methods used in vehicle fabrication. As the representative of a market that purchases vehicles in bulk, the TLC has some leeway to articulate its interest in sustainable design; by demonstrating a demand for green technologies, the TLC may be able to influence design or production priorities.

Locally, the TLC could investigate standards for more benign materials and processes in cab interior fabrication. It could look for opportunities to require those materials in the after-market process of cab hack-up, and it could influence local component designers and installers to create cab modifications adapted for easy disassembly and reuse.

Incentives provide another way to promote vehicle innovation. If necessary, TLC could provide incentives to medallion owners to adopt promising vehicle types—for example, advertising could be permitted on such vehicles, the TLC could assume

responsibility for any difference in maintenance costs, or the vehicle retirement age could be extended (assuming they continued to meet other inspection criteria).

Investigate New Cab Designs with Peer Agencies

The TLC can continue to confer with taxi regulators in other cities to develop joint (and city-specific) standards and requirements for new cab designs. This type of outreach has occurred with other stakeholders, a recent example being the Design Trust and TLC's joint presentation on Taxi 07 to the International Association of Transportation Regulators conference in September 2006. Beyond modifying existing vehicles, the TLC and other national peer agencies could study the feasibility of supporting the design and manufacturing of a purpose-built cab vehicle. By joining forces, a national consortium of regulators could coordinate with and influence large and small commercial automakers; the aim of any such effort would be to 'get ahead' of the vehicle-design process and assist auto entrepreneurs or major manufacturers in creating a viable and versatile vehicle that would reflect the needs of fleets around the country.

"IF IT'S A REALISTIC GOAL, I WOULD LOVE TO SEE HYBRID CABS OR EVEN ELECTRIC ONES."
TAXI PASSENGER, DESIGN TRUST SURVEY

Inspire Drivers and Passengers to Become Advocates

New York City is recognized as the taxi regulation leader around the world, but there is always room for improvement. Drivers and passengers know very well where these improvements are needed, and are important voices for change. The TLC should continue to reassure and train drivers about new taxi models and how to get the greatest gains, environmental and economic, out of hybrids. The agency could also build a constituency for further environmental gains through effective publicity about existing programs and future opportunities. Promotional and educational TLC-branded programs could inform riders and other New Yorkers about the measurable qualitative and quantitative progress in TLC environmental programs; that the TLC is a champion of sustainable mobility in New York, not a follower; and how new, safe, and green taxi vehicles are. Any campaign of this type should not happen in isolation, but should be part of an overall effort by the TLC to communicate its vision for the taxi system.

BACKMATTER

APPENDIX: TAXI 07 PASSENGER SURVEY

In September 2006 the Design Trust for Public Space posted an online survey of taxi passengers, to which 506 responses were received. In terms of gender, income, and place of residence, the demographics of the sample population generally correspond to those of taxi commuters in the 2000 Census, suggesting that the sample is a reasonable representation of current taxi users, as opposed to the entire population.

However, since the active marketing for the survey was carried out through the websites and newsletters of civic and design organizations—including the Design Trust for Public Space, Design Observer, Transportation Alternatives, Project for Public Spaces, and Gothamist—responses to survey questions specifically relating to environmental or design issues are probably skewed. Note also that there was no specific outreach to members of the taxi industry, as the goal was to elicit opinions from typical passengers. Finally, some respondents with disabilities reported difficulty accessing the survey, perhaps limiting their response.

For further analysis of the survey results, please see the Usability section, above. Selected quotes from responses to open-ended survey questions are located throughout of this book. Quotes have been edited for clarity and length. Complete results to closed-ended questions are provided below.

SURVEY DEMOGRAPHICS

Respondents
506

Gender

Male	49%
Female	51%

Age

Under 18	0.2%
18-35	58.2%
36-50	27.1%
51-65	13.1%
Over 65	1.4%

Personal Annual Income:

under $50k	30%
50-75k	22%
75-100k	19%
over $100k	29%

Number of Vehicles in Household:

0	59%
1	31%
2	7%
3	1%
>3	1%

Residence:

Manhattan	50%
Brooklyn	29%
Queens	6%
Bronx	2%
Staten Island	0%
Long Island, NJ, CT	6%
Other	7%

Workplace:

Downtown Manhattan	34%
Midtown Manhattan	40%
Other Manhattan	11%
Brooklyn	4%
Queens	3%
Bronx	1%
Staten Island	0%
Long Island, NJ, CT	1%
Other	6%

Modes of Transportation:

Subway/Bus	98%
Walk	95%
Taxi	87%
Car service	53%
Bike	36%
My car	29%
Passenger in other's car	24%
Commuter rail	20%
Ferry	8%
Motorcycle/Moped	2%

SURVEY RESPONSES

What are the most common reasons you take cabs?

It's late/I'm tired	70%
In a hurry, trying to save time	62%
I've got luggage/I'm traveling	60%
Carrying something big/awkward	57%
The weather is bad	48%
Traveling with others, it's economical	36%
Somebody else is paying	35%
More comfortable, to treat myself	32%
Easier than mass transit/walking	29%
Other	13%
Easier than taking the car	11%
So I can make calls/Talk to a companion	9%
Want some private time	4%

How often are you coming from these locations? (Results combine "daily" and "weekly" responses)

Dining / Entertainment	36%
Home	25%
Workplace	23%
Business Appointments	21%
Personal Engagements	21%
Shopping	9%
Bus or Train Terminals	5%
Airports	5%
Medical Appointments	3%
Hotels	2%

What are the destinations of your cab rides? How often? (Results combine "daily" and "weekly" responses)

Home	38%
Dining / Entertainment	27%
Business Appointments	20%
Personal Engagements	18%
Workplace	14%
Shopping	7%
Airports	5%
Bus or Train Terminals	4%
Medical Appointments	4%
Hotels	1%

When do you take taxis? (Results combine "often" and "sometimes" responses)

Weekday morning peak (6-10 a.m.)	36%
Weekdays	56%
Weekday evening peak (4-8 p.m.)	51%
Weekday nights	73%
Weekend mornings	17%
Weekend afternoons	28%
Weekend nights	79%

When is it difficult to hail a taxi?

Weekday morning peak (6-10 a.m.)	32%
Weekdays (midday)	12%
Weekday evening peak (4-8 p.m.)	69%
Weekday nights	14%
Weekend mornings	4%
Weekend afternoons	7%
Weekend nights	40%
Never had difficulty hailing a taxi	9%

Where is it difficult to hail a taxi?

Midtown Manhattan (14th St. to 60th St.)	47%
Brooklyn	37%
Lower Manhattan (below 14th Street)	37%
Queens	19%
Upper Manhattan (above 96th Street)	14%
The Bronx	11%
Upper East Side	9%
Staten Island	9%
Upper West Side	8%
JFK Airport	5%
LaGuardia Airport	4%
Other	11%

Have you ever been refused a ride in a taxi?

Yes	59%
No	41%

How did you get there instead?

Hailed another taxi	67%
Used public transit (bus, subway)	16%
Walked or biked	6%
Called a car service	4%
Other	8%

Which improvements make you more likely to take a cab?

All taxis accept debit/credit cards	76%
All taxis accept Metrocards	72%
Environmentally-friendly taxis	69%
Special taxi-only lanes on city streets	66%
Hail taxi with cell phone or text message for free	62%
Drivers prohibited from using cell phones	48%
Better enforcement of cleanliness standards	47%
Additional taxi stands	42%
Hail taxi with cell phone or text message for $1 surcharge	31%
Built-in child seats	14%
Wheelchair accessibility	11%

*This does not vary by gender or income

How much do you agree with the following statements? (Results combine "agree" and "strongly agree" responses)

I consider time of other transportation.	94%
I feel comfortable riding the bus/subway.	90%
I consider the cost before hailing a taxi.	83%
Taxis help me live without a car.	66%
Cab drivers know their way around.	62%
I feel safe in a taxi.	48%

*Note that more people are comfortable riding the bus/subway than feel safe in a taxi. This result does not vary by gender.

SURVEY CROSSTAB ANALYSES

Trip Origin by Income

	<50k	50--75k	75-100k	>100k
From Home	21%	11%	24%	41%
From Work	15%	19%	19%	38%
From Eating/ Entertainment	31%	29%	38%	50%
From Business Appointments	10%	19%	22%	34%
From Personal Appointments	17%	18%	14%	33%
From Shopping	4%	9%	6%	15%

Trip Destination by Income

	<50k	50--75k	75-100k	>100k
To Home	34%	29%	41%	48%
To Work	8%	8%	11%	28%
To Eating/ Entertainment	23%	17%	30%	42%
To Business Appointments	10%	16%	22%	37%
To Personal Appointments	15%	13%	13%	30%
To Shopping	4%	6%	1%	13%

Trip Origin by Home Borough *Only Manhattan and Brooklyn had enough responses to perform statistically significant analyses.

	Manhattan	Brooklyn
Home	44%	8%
Work	30%	14%
Entertainment	51%	23%
Business	25%	13%
Personal	32%	12%
Shopping	13%	2%

Trip Destination by Home Borough *Only Manhattan and Brooklyn had enough responses to perform statistically significant analyses.

	Manhattan	Brooklyn
Home	54%	28%
Work	19%	4%
Entertainment	43%	11%
Business	25%	11%
Personal	29%	6%
Shopping	12%	0%

ACKNOWLEDGEMENTS

The creation of *Taxi 07: Roads Forward* would not have been possible without the generosity and expertise of many individuals. The Design Trust for Public Space and the project fellows would like to extend their sincere appreciation to all of the following for their assistance and thoughtful guidance.

AT THE NYC TAXI & LIMOUSINE COMMISSION

Many thanks to the staff of the New York City Taxi & Limousine Commission and especially to the following, who provided invaluable assistance and feedback to the Design Trust project team:

Matthew Daus, *Commissioner*

Samara Epstein, *Director of Constituent Affairs*

Allan Fromberg, *Deputy Commissioner for Public Affairs*

Eric Kim, *former Chief of Staff to the First Deputy Commissioner*

Sara Meyers, *Director of Special Projects, Office of the First Deputy Commissioner*

Jennifer Palmer, *Assistant Director of Constituent Affairs*

Andrew Salkin, *First Deputy Commissioner*

Peter Schenkman, *Assistant Commissioner, Safety & Emissions Division*

INTERVIEW PARTICIPANTS

Over the course of researching and writing this document, the Design Trust project fellows interviewed a broad range of industry stakeholders, taxi advocates, and other experts. Their insights were invaluable. On occasion, the fellows have quoted directly from those interviews in this document; to respect the sensitive nature of some interview material, those quotations are noted as deriving from Design Trust interviews, but are anonymous.

Please note that the opinions expressed in this publication are the authors' own. The following interview participants should not be understood to have offered any authorization or approval of the findings or recommendations contained herein.

Andrew Bata, *Senior Director, Strategic Planning, New Technology Implementation, Telecommunications and Information Services, MTA NYC Transit* (telephone interview, August 7, 2006)

Jason Cross, *Greater London Authority* (telephone interview, September 25, 2006)

Jesse Davis, *Chief Operating Officer, Creative Mobile Technology* (personal interview, September 28, 2006)

Andrew Dent, *Vice President, Material ConneXion* (personal interview, September 27, 2006)

Bhairavi Desai, *Executive Director, New York Taxi Workers Alliance* (personal interview, January 30, 2007)

Victor Dizengoff, *Executive Director, Black Car Assistance Corp.* (personal interview, August 30, 2006)

Dean Featherling, *Project Manager for Passenger Information Monitor, Digital Dispatch Systems* (personal interview, October 20, 2006)

Evgeny Freidman, *Co-owner, Taxi Club Management* (telephone interview, October 19, 2006)

Mark Gallagher, *City Taxi Brokerage* (telephone interview, September 29, 2006)

Neil Greenbaum, *Owner, Pearland Brokerage/All Taxi Management* (telephone interview, October 17, 2006)

Sandy Hornick, *Deputy Executive Director, New York City Department of City Planning* (personal interview, September 14, 2006)

Steve Jackel, *former TLC Administrative Law Judge* (personal interview, August 10, 2006)

Richard Kay, *President, League of Mutual Taxi Owners, and CEO, LOMTO Federal Credit Union* (telephone interview, November 2, 2006)

Michael Kowalsky, *President, Medallion Funding Corp.* (telephone interview, October 26, 2006)

Mike Levine, *President, Ronart Leasing Corp.* (personal interview, August 11, 2006)

Terry Moakley, *Project Manager, Taxis for All* (personal interview, October 23, 2006)

Alexis Perrotta, *Senior Policy Analyst, Regional Plan Association* (personal interview, September 20, 2006)

David Pollack, *Executive Director, Committee for Taxi Safety* (personal interview, August 15 2006, and telephone interview, October 20, 2006)

Eric Rodenbeck, *CEO, Stamen Design* (telephone interview, November 7, 2006)

Jean Ryan, *Vice President, Disabled in Action* (personal interview, October 3, 2006)

Bruce Schaller, *Principal, Schaller Consulting* (personal and telephone interviews, multiple dates in 2006)

Ed Sloam, *President, Taxi Technology* (telephone interview, September 27, 2006)

Amos Tamam, *Taxitronic* (personal interview, October 8, 2007)

Erhan Tuncel, *medallion owner and taxi driver* (personal interview, July 24, 2007)

Nathan Willensky, *collector of cab memorabilia* (personal interview, September 21, 2006)

"Phil," *FHV driver* (anonymous personal interview with visual ethnographer, September 15, 2006)

"Sean," *FHV driver* (anonymous personal interview with visual ethnographer, September 15, 2006)

PEER REVIEWERS

The Design Trust is grateful to the following transportation experts and civic organizations for providing factual review and comment on an early draft of this document. Where appropriate, specific comments from these reviewers have been incorporated into the document and flagged as such. The reviewers should not be understood to have offered any authorization or approval of the findings or recommendations contained herein. Any errors of fact or omission are solely the authors' own.

Andrew Bata, *Senior Director, Strategic Planning, New Technology Implementation, Telecommunications and Information Services, MTA NYC Transit*

Noah Budnick, *Deputy Director for Advocacy, Transportation Alternatives*

Jonathan Drescher, *Associate Principal, Ove Arup & Partners*

Wim Faber, *Transportation Journalist, Netherlands*

Ted Grozier, *Associate, Green Order*

John Liu, *Councilmember and Chair of Transportation Committee, New York City Council*

Metropolitan Taxicab Board of Trade

Yerina Mugica, *Research Associate, Natural Resources Defense Council*

Matthew Sapolin, *Commissioner, New York City*

Mayor's Office for People with Disabilities

Bruce Schaller, *Principal, Schaller Consulting*

SPECIAL THANKS

Elena Alschuler, HR&A Advisors, Inc., for contributions to the design and analysis of the *Design Trust Taxi 07 Passenger Survey.*

Michael Bierut, *Design Observer*, for help publicizing the *Design Trust Taxi 07 Passenger Survey.*

Melissa Cliver, for visual ethnography and interview assistance.

Jake Dobkin, *Gothamist*, for publicizing the *Design Trust Taxi 07 Passenger Survey.*

Rachel Griffin and Emily Anderson, mgmt. design

Ben Freid, *Project for Public Spaces*, for help publicizing the *Design Trust Taxi 07 Passenger Survey.*

Paul Herzan, Chairman, Cooper-Hewitt National Design Museum, Smithsonian Institution

Imagination, USA Inc.

Jonathan Sills, *Municipal Arts Society*, for help publicizing the *Design Trust Taxi 07 Passenger Survey.*

Dani Simons, *Transportation Alternatives*, for help publicizing the *Design Trust Taxi 07 Passenger Survey.*

Robbyn Stewart, *Customer Services*, JFK International Airport, for assistance with access to the Central Taxi Hold.

Ed Thompson, *Taxi & Private Hire Director*, Transport for London, for assisting with information about Zingo.

CONTRIBUTORS

DESIGN TRUST FELLOWS

Rachel Abrams
Rachel Abrams is a writer and interaction designer. As Creative Director at Turnstone Consulting LLC, she designs people-friendly, technology-mediated experiences for commercial spaces and public places. Her fellowship was made possible, in part, with the endorsement of her previous employer, Imagination (USA) Inc. Before that, she worked for IBM and Nokia. Her writing, about the social implications of design and technology, has been published by *The Economist*, Adobe.com, BBC, eDesign, *Frieze*, Graphics International, and others. She graduated in Social and Political Sciences from Cambridge University and has an M.A. in Computer Related Design from the Royal College of Art, UK.

Sylvia Harris
Sylvia Harris is a communications strategist who puts design and information to work for the public sector. She was the lead design strategist for the redesign of the 2000 National Census forms and is currently a member of the Citizens' Stamp Advisory Committee. She recently developed information master plans for New York Presbyterian Hospital, New York's Lincoln Center, and Columbia University. Harris was a design critic at the Yale University School of Art from 1990 through 2000. She received her M.F.A. from Yale in 1980 and a B.F.A. from Virginia Commonwealth University in 1975.

Adam Millard-Ball
Adam Millard-Ball is a transportation planner and environmental policy researcher. He is currently a doctoral student at Stanford University's Interdisciplinary Program in Environment and Resources, where he is examining the effectiveness of local climate change plans in reducing greenhouse gas emissions. Previously, while a principal at Nelson \Nygaard, his consulting focused on taxi regulation, parking policy, and car-sharing. His research studies have been published by U.S. EPA and the Transportation Research Board. His international experience includes a stint as a transportation policy journalist in London, and parking and Bus Rapid Transit planning in Dar es Salaam, Tanzania.

Eric Rothman
Eric Rothman has extensive experience in strategic planning, transportation, and economic development. As President of HR&A Advisors, Inc., he has managed complex projects for transportation and development agencies in New York, Boston, Washington, and Los Angeles. From 2001 to 2004, he served as Director of strategic business planning at Transport for London. Previously, he worked in the Capital Program Development office at the New York City Transit Authority and as a financial analyst at Goldman, Sachs & Co. Mr. Rothman received a Bachelor's degree from Princeton University and a Master of Public Policy from the Kennedy School of Government, Harvard University.

Anisha Sawhney
Anisha Sawhney is an architect and planner. She is now working with Halcrow, Inc. on a number of design and master-planning projects addressing pedestrian access and transport issues, including Brooklyn Bridge Park. Before moving to New York in 2005, Ms. Sawhney worked on modeling and integrating pedestrian movement and transit for Buro Happold Engineers and Space Syntax Ltd. in the UK, and previously in New Delhi, India. She holds a Diploma in architecture from TVB School of Habitat Studies, India, with a Gold Medal for her thesis, and a Masters in Advanced Architectural Studies with Distinction from The Bartlett School, University College London, UK.

Rachel Weinberger
Rachel Weinberger is Assistant Professor of City and Regional Planning at the University of Pennsylvania. Her areas of expertise include land use transportation interactions, travel demand fore-casting, urban economics, and econometric analysis for transportation planning. Prior to joining the faculty at PennDesign, Dr. Weinberger worked in private practice, most recently as a principal with Nelson\Nygaard consulting associates. Dr. Weinberger holds the degrees Master of Urban Planning from Hunter College of the City of New York, Master of Science in Transportation Engineering from the University of California at Berkeley, and a Doctorate in Urban and Regional Planning, also from the University of California at Berkeley.

ART AND DESIGN

Jason Little
Jason Little is a cartoonist. He won the Xeric Grant in 1998 for *Jack's Luck Runs Out*. In 2002 Doubleday published *Shutterbug Follies*, which subsequently won two Ignatz awards. He is presently working on the second book in the "Bee" series, *Motel Art Improvement Service*, which Little, Brown & Co. will publish in 2008. He has had short works published by *Drawn & Quarterly*, *Fantagraphics*, and *Top Shelf*. He has curated three installation shows for Flux Factory's "Comix Fluxture" series: "Cartünnel" (a walk-through comics labyrinth), "Comix Ex Machina" (comics machines) and "Opolis" (a giant-scale miniature city). Visit his website at http://www.beecomix.com/.

MGMT. design
MGMT. is a collaborative graphic design studio based in Brooklyn and Minneapolis. MGMT. has extensive experience in print, branding, and exhibition exhibition design, as well as environment design, information, packaging, and web design. The principals of MGMT. are Ariel Apte Carter, Alicia Cheng, and Sarah Gephart.
www.mgmtdesign.com

Stewart Simons
Stewart Simons is a photographer. He received a BFA in photography from R.I.T. in 1993 and an MFA in fine art in 1999 from Goldsmiths College, University of London, England, where he studied with the artists Wolfgang Tillmans and Jake Chapman. After a period as a studio assistant to the Chapman brothers, Stewart began shooting editorially for magazines such as *The Face*, *Dazed and Confused*, and *Another Magazine*. Other U.K. clients include Virgin Records, The BBC Channel Four, and BMG Records. Since returning to New York in 2003, Stewart has shot for W Magazine, The Fader, and ESPN Magazine. His next personal project, tentatively titled "The Hunters," will explore deer-hunting culture in the Midwest. Visit his website at http://www.stewartsimons.com/.

OTHER CONTRIBUTORS

Do Mi Stauber, Indexer
Emily Yuhas, GIS Technician

REFERENCES

American Automobile Association (AAA). (2006). Your Driving Costs. Available at: www.aaapublicaffairs.com/Assets/Files/2006328123200.YourDrivingCosts2006.pdf

American Public Transportation Association (APTA). (2006, April). *Public Transportation Fact Book, 57th Edition.* Available at: http://www.apta.com/research/stats/factbook/ City of New York. PlaNYC. Available at: http://www.nyc.gov/planyc2030

Ecology Center. (2006). *Toxic at Any Speed: Chemicals in Cars and the Need for Safe Alternatives.* Available at: http://www.ecocenter.org/toxicatanyspeed.shtml

Hawken, Paul, Lovins, Amory, and Lovins, L. Hunter. (1999). Natural Capitalism. Boston: Little, Brown, and Co.

Jacobs, Jane. (1961). *The Death and Life of Great American Cities.* New York: Random House.

Malanga, Steve. (2002, Spring). How to fix Gotham's taxi mess. *City Journal.* Available at: http://www.city-journal.org/html/12_2_how_to_fix.html

McDonough, William and Braungart, Michael. (2002). *Cradle to Cradle.* New York: North Point Press.

Millard-Ball, Adam et. al. (2005). *Car-Sharing: Where and How it Succeeds.* Washington, D.C.: Transportation Research Board.

Newman, P. and Kenworthy, J. (1999). *Sustainability and Cities.* Washington, D.C.: Island Press.

New York City Taxi & Limousine Commission. (2006, March 9). Leasing Review. Overview/Update. Available at: www.nyc.gov/html/tlc/downloads/pdf/leasing_update.pdf

New York City Taxi & Limousine Commission. (2006, September 14). State of the Fare: A Periodic Evaluation. Available at: http://www.nyc.gov/html/tlc/downloads/pdf/ppt_periodic_fare_review_09_14_2006.pdf

Parsons Brinckerhoff Quade & Douglas, Inc. (2000, February). *Regional Travel-Household Interview Survey.* Prepared for the New York Metropolitan Transportation Council (NYMTC) and the North Jersey Transportation Planning Authority (NJTPA). Available at: http://www.nymtc.org/project/surveys/files/fr00321.pdf

Peterson, Bo. (1995). Demand-responsive public transport. *Public Transport International.* 44(1): 6-10.

Richard, Michael Graham. (2005, June 21). Popular Support for Hybrid Cabs in NYC. Treehugger.com. Available at: http://www.treehugger.com/files/2005/06/popular_support.php

Schaller, Bruce and Gilbert, Gorman. (1995). Factors of production in a regulated industry: Improving the proficiency of New York City taxicab drivers. *Transportation Quarterly.* 49(4): 84.

Schaller, Bruce. (1999). Elasticities for taxicab fares and service availability. *Transportation.* 26: 283-297. Available at: http://www.schallerconsult.com/taxi/elastic.pdf

Schaller, Bruce. (2004). *Higher Pay, Safer Cabbies: The Relationship Between Driver Incomes and Taxi Crashes in NYC.* Prepared for Transportation Alternatives. Available at: http://www.transalt.org/press/releases/040112safercabbies.pdf

Schaller, Bruce. (2006). *The New York City Taxicab Fact Book.* Available at: http://www.schallerconsult.com/taxi/taxifb.htm

Schenkman, Peter. (2006, March 9). The State of the NYC Taxi. Prepared for New York City Taxi & Limousine Commission. Available at: http://www.nyc.gov/html/tlc/downloads/pdf/state_of_taxi.pdf

Schenkman, Peter. (2006, September 16). Clean Fuel Taxicabs: An Overview. Prepared on behalf of the New York City Taxi & Limousine Commission for presentation at the International Association of Transportation Regulators, 19th Annual Conference. Available at: http://iatr.org/files/IATR-%20Peter%20Schenkman.ppt

Shoup, Donald. (2006). *The High Cost of Free Parking.* Chicago: Planners' Press.

Teal, Roger F. (1992). An Overview of the American Experience with Taxi Deregulation. *Proceedings of the International Conference on Taxi Regulation, Montreal.* 123-138.

Transport for London. (2003). *Taxi Ranks at Major Interchanges. Best Practice Guidelines.* Available at: http://www.tfl.gov.uk/pdfdocs/taxi-best-practices.pdf

U.S. Census Bureau. (2004, March). Journey to Work: 2000 (C2KBR-33). Available at: http://www.census.gov/prod/2004pubs/c2kbr-33.pdf

United Nations. 1987. "Report of the World Commission on Environment and Development." General Assembly Resolution 42/187." December 1987.

United States Department of Energy, Environmental Protection Agency. 2007. Fuel Economy Ratings. Availalbe at http://www.fueleconomy.gov.

Urbitran Associates, Inc. (2004, February). *Impact Study of the Issuance of Additional Taxicab Medallions: Final Environmental Impact Statement.* Prepared for NYC Taxi & Limousine Commission. Available at: http://www.nyc.gov/html/tlc/downloads/pdf/env_impact_statement.pdf

Watson, George. (2001, January 28). Extreme sport: Hailing cabs. *New York Times.*

INDEX

The publication of *Taxi 07: Roads Forward* was made possible through the generous support of the following sponsors:

Lily Auchincloss Foundation, Inc.

Lily Auchincloss Foundation

THE NEW YORK COMMUNITY TRUST NYCT

New York Community Trust

J.M. KAPLAN FUND

J.M. Kaplan Fund

HR&A Analyze. Advise. Act.

HR&A Advisors, Inc.

TAXI 07: ROADS FORWARD IS A SELECTIVE GUIDE TO THE CURRENT NEW YORK CITY TAXI SYSTEM AND AN EXPLORATION OF WAYS THE CITY'S TAXI SERVICES MIGHT BE IMPROVED.

A joint project of the Design Trust for Public Space and the New York City Taxi & Limousine Commission, *Taxi 07: Roads Forward* asks, how can the taxi best function as a vital part of New York's public realm? And how can taxis be optimally regulated to provide an excellent transportation service for all passengers, as well as industry stakeholders and the city at large?

Taxi 07: Roads Forward accepts a fundamental premise: that New York's taxi services form a system—a network of interactions between people, vehicles, and the city itself. The focus of this publication is on understanding those interactions, and then considering what feasible, cost-effective, incremental changes might improve taxi services over the next ten years.

OS

VARD

Design Trust for Public Space
http://www.designtrust.org/

New York City Taxi & Limousine Commission
http://www.nyc.gov/tlc

ISBN 978-0-9777175-1-4