

# Urban Freight Transport: The Final Frontier (and our role as the pioneers...)

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- ❖ What could we do to improve urban freight?
  - ❖ Public sector interventions
  - ❖ Research needs
- ❖ An example: The Off-Hours Delivery Project in New York City

What is the freight system?

# The freight system

❖ The conglomerate of all the economic entities involved in the generation, transportation, consumption, and transformation of cargo

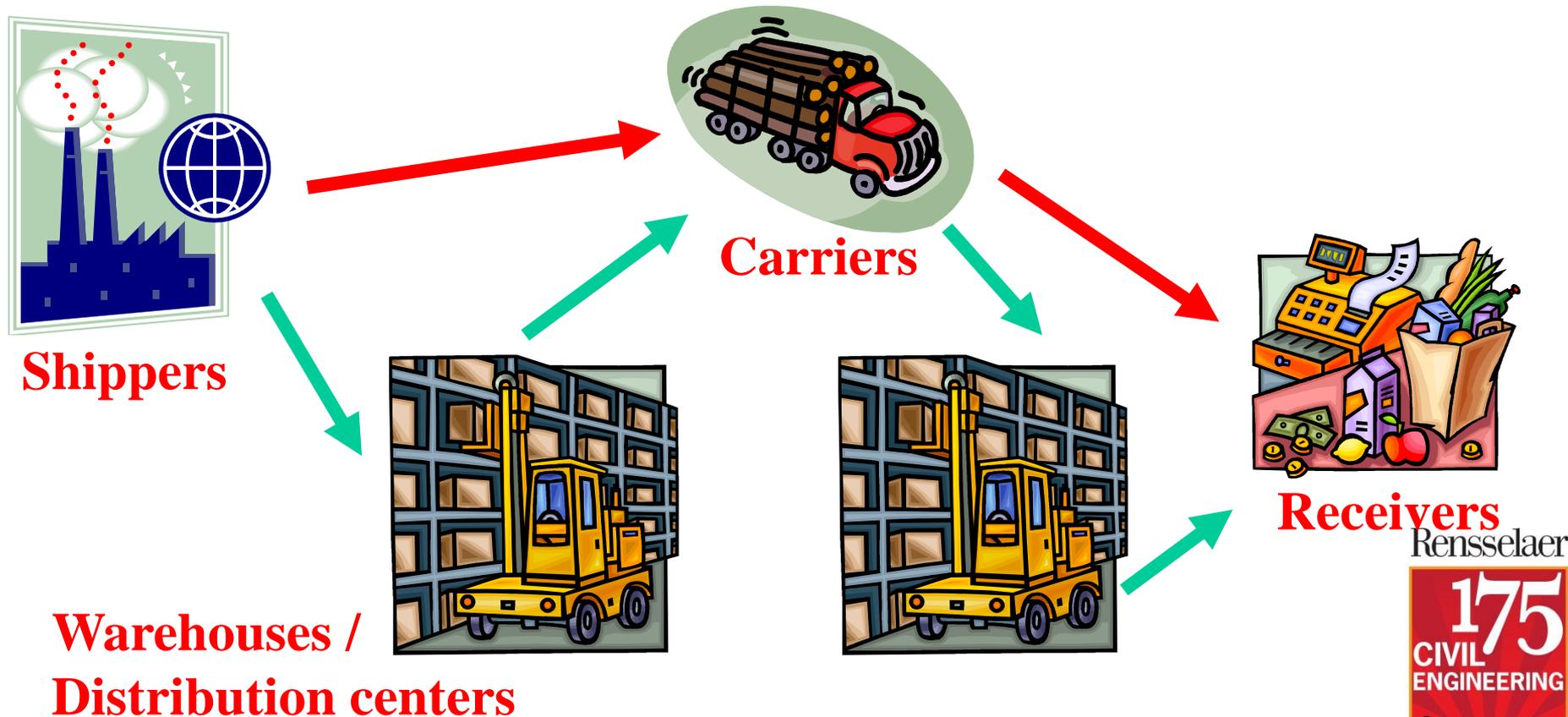
These are key to behavior change

❖ Key agents:

- ❖ Producers, the ones that manufacture/produce the goods
- ❖ Shippers, the ones that send the goods
- ❖ Receivers, the ones that use the goods transported
- ❖ Carriers, the ones that transport the goods
- ❖ Ancillary functions: warehouses, distribution centers, etc.

# There are many players and ways to interact

- ❖ Interactions among players determine truck traffic patterns (Shippers, warehouses, distribution centers, carriers and receivers, 3PLs, 4PLs)



# Relatively low efficiency, due to market forces <sup>6</sup>

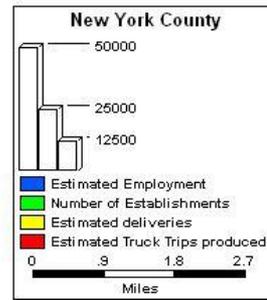
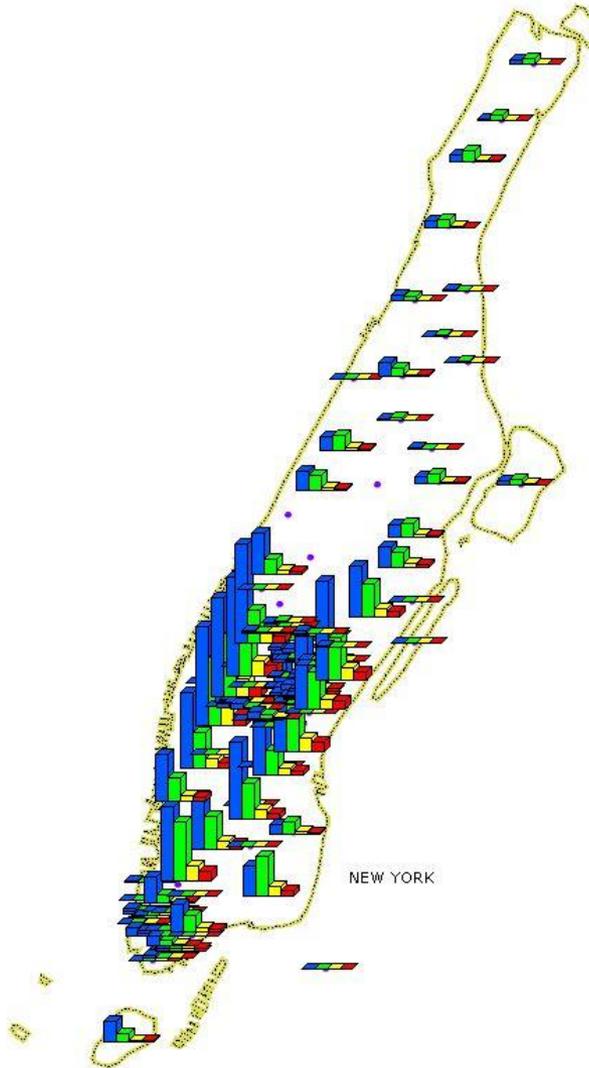
- ❖ Although current trucking practices are efficient from the private company perspective, they are very inefficient from the system point of view
- ❖ Surveys show that about:
  - ❖ 25% of the truck trips are empty
  - ❖ Only 20% of the truck capacity is utilized
- ❖ Increasing this efficiency will translate into more livable cities and a more productive economy

# NYMTC REGION

County	Area	Population	Establishments	Estimated employment	Estimated daily deliveries received	Percentage of total deliveries received per day	Estimated daily truck trips produced	Percentage of total truck trips produced per day
BRONX	42.15	1,332,650	7,754	91,787	19,900	4%	14,048	4%
BROOKLYN	70.88	2,465,326	23,262	232,199	58,114	13%	40,883	12%
NASSAU	287.96	1,334,544	24,142	314,287	62,828	14%	46,956	14%
<b>MANHATTAN</b>	23.09	1,537,195	40,415	692,260	113,069	26%	76,874	23%
PUTNAM	245.91	95,745	1,731	14,937	4,040	1%	3,298	1%
QUEENS	109.71	2,229,379	23,276	290,156	55,737	13%	46,390	14%
RICHMOND	58.74	443,728	4,268	49,668	10,136	2%	8,182	2%
ROCKLAND	192.39	286,753	4,547	60,963	11,600	3%	8,895	3%
SUFFOLK	926.81	1,419,369	26,787	357,405	69,234	16%	52,788	16%
WESTCHESTER	465.79	923,459	15,127	204,525	38,498	9%	30,477	9%
<b>Grand Total</b>	<b>2,423.43</b>	<b>12,068,148.00</b>	<b>171,309.00</b>	<b>2,308,184.50</b>	<b>443,155.77</b>	<b>100%</b>	<b>328,790.82</b>	<b>100%</b>

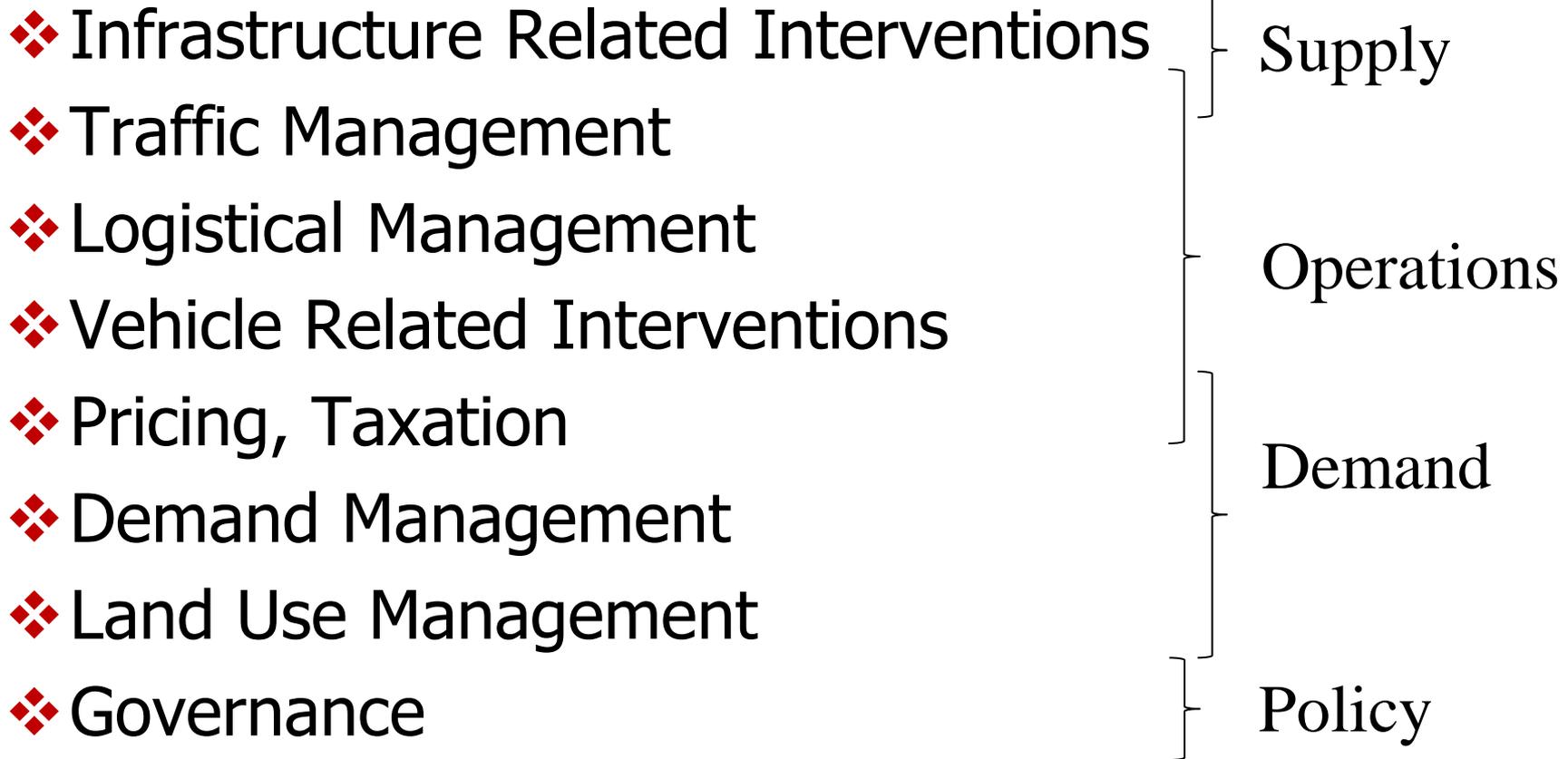


# New York County



What Could the Public Sector  
and Academia Do?  
The Short Answer is: A Lot...

# Range of interventions (from NCFRP 38)



# Traffic Management

- ❖ Access Time Restrictions
- ❖ Vehicle Size Restrictions
- ❖ Truck Traffic/Route Regulations:
  - ❖ Advisory, Statutory, Freight Routes
- ❖ Lane Management:
  - ❖ Multi-use lanes, exclusive truck lanes
- ❖ Traffic Signals and Signs
- ❖ General Infrastructure Investments

To be considered very carefully, they could make things worse

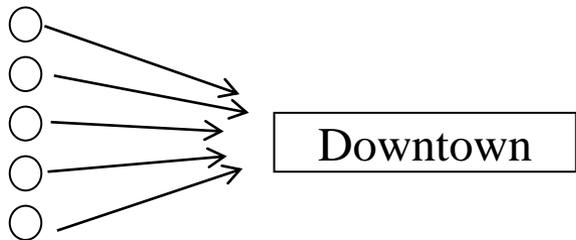
# Freight loading zone (Waikiki, Hawaii)



## ❖ Pick-up/Delivery to Alternate Destinations

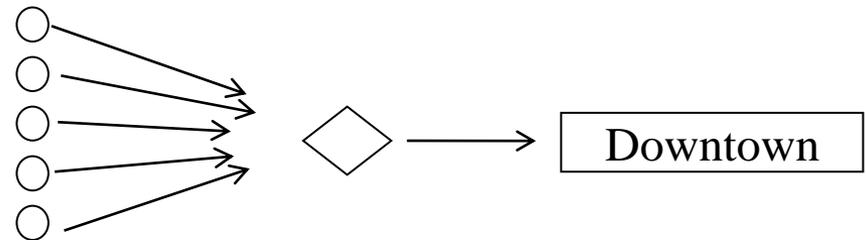


## ❖ Joint Delivery Service / Urban Consolidation Centers



Carriers

a) Current condition



Carriers

JDS

b) With JDS doing the last leg of deliveries

## ❖ Intelligent Transport Systems, Improve last leg

# La Petite Reine

- ❖ Source of local employment, engages in labor re-training & socially responsible practices
- ❖ Ally of companies interested in sustainability
- ❖ Vehicles equipped with batteries to assist pedaling
- ❖ Could use bicycle lanes, able to enter narrow streets and pedestrian areas, and to park in front receivers



# Muni Meters in NYC



# Pricing, Taxation

- ❖ Carefully use freight road pricing
  - ❖ Of limited effectiveness to reduce congestion
  - ❖ Could produce significant revenues to finance improvements
- ❖ Foster differentiated parking charges
- ❖ Make sure that vehicle license fees reflect externalities produced by vehicles, age, condition, etc.

# Typical Freight Village

Freight Village Plan



# Governance

- ❖ Create industry advisory groups
- ❖ Create freight quality partnership
- ❖ Share best practices
- ❖ Conduct regular meetings with industry

# The Off-Hours Delivery Project

## An example of demand management

# Interlocking components

- ❖ Demand modeling/behavioral/economic components
  - ❖ Analyses of most promising industry segments
  - ❖ Freight trip generation analyses
- ❖ Technology component
  - ❖ GPS to assess performance (cell phones, own systems)
- ❖ Network modeling component
  - ❖ Mesoscale traffic model to assess local impacts
  - ❖ Regional model to assess networkwide impacts
- ❖ Industry/Agency outreach component
  - ❖ To get feedback from all involved
- ❖ Small scale pilot test component
  - ❖ To assess real life impacts...

**JHV aged  
twenty years**



# Pilot Test

- ❖ Initial efforts delayed by Wall Street collapse, skepticism on the part of the industry...initially a huge challenge because of lack of precedents
- ❖ Original plan: Sysco and Whole Foods
- ❖ Foot Locker/New Deal Logistics asked to join test
- ❖ Three separate stages to accommodate them:
  - ❖ Foot Locker (10 stores)/NDL (Oct. 2 -Nov.14, 2009)
  - ❖ Whole Foods (four stores) (Dec. 28, 2009-Jan. 31, 2010)
  - ❖ Sysco (twenty one stores) (Dec. 21, 2009-Jan. 23, 2010)
- ❖ About 35 receivers, 20 trucks/vendors
  - ❖ Half doing staffed OHD
  - ❖ Half doing unassisted OHD

# Regular vs. Off-Hour Deliveries



# Typical results from satisfaction surveys

## Scale:

1= Very favorable,  
5= Very unfavorable

❖ Whole Food Vendors: 1.55

❖ Participating drivers:

❖ Travel speeds = 1.33

❖ Congestion = 1.11

❖ Parking = 1.11

❖ Stress levels = 1.11

❖ Time to deliver goods = 1.38

❖ Time to complete the route = 1.44

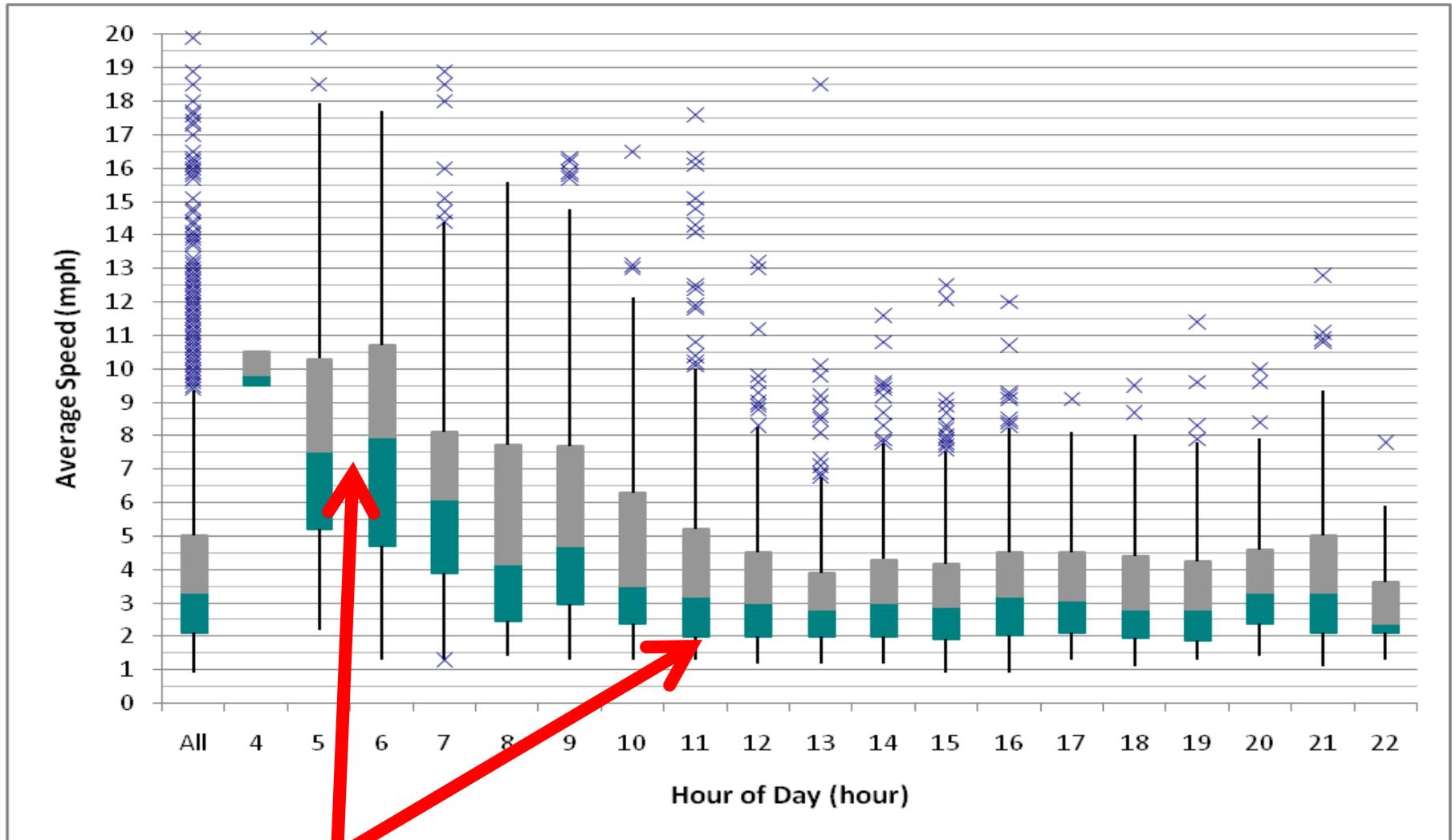
❖ Driver's feeling of safety = 1.86

❖ Sysco's customers:

❖ Impression of off-hour deliveries = 1.50

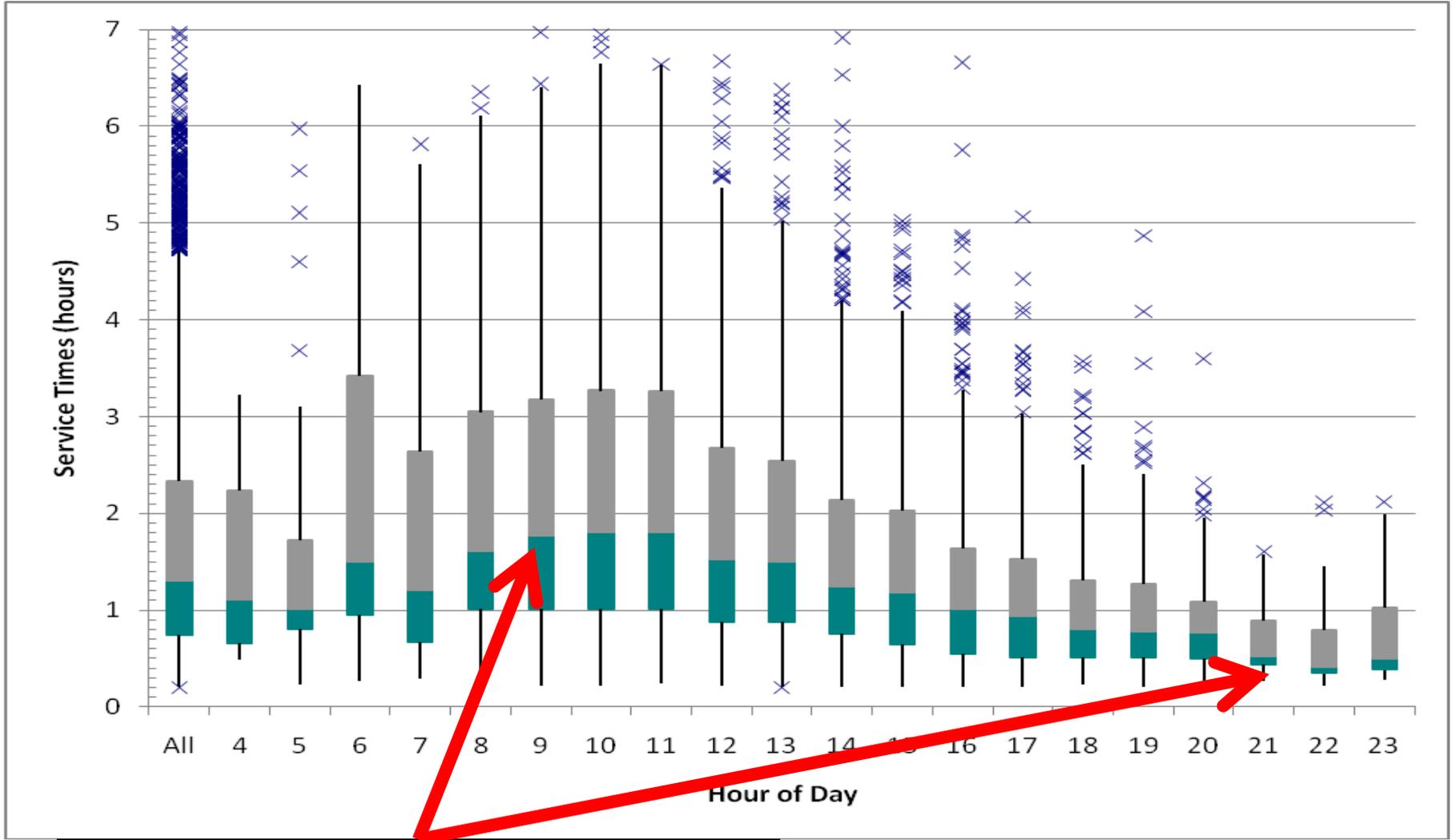
❖ How likely are you to accept off-hour deliveries = 1.42

# Average space mean speeds



**More than twice as fast**

# Average service times



**More than three times as fast**

# After the end of the pilot

- ❖ All of the receivers doing staffed OHD reverted back to the regular hours
- ❖ Almost all the receivers doing unassisted OHD remained in the off-hours
  - ❖ The reason: reliability of OHD
  - ❖ “Our locations will continue to receive ‘night drops’ even though this program has ended as our managers now favor the dependability of night drops vs. late day time deliveries. Thanks again for the program.” Nick Kenner, Managing Partner, Just Salad LLC

# The Economic Bottom Line

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# Economic Impacts

- ❖ Implementing various forms of off-hour delivery policies in Manhattan leads to:
  - ❖ Travel time savings to all highway users of about 3-5 minutes per trip
  - ❖ Travel time savings to carriers that switch to the off-hours of about 48 minutes per delivery tour
  - ❖ Savings in service times (per tour) could be in the range of 1-3 hours
- ❖ Depending on the extent of the policies, economic savings are between \$100 and \$200 million/year in travel time savings and pollution reduction

# Environmental Pollution Reductions

Scenario		CO	HC	NO <sub>x</sub>	PM <sub>10</sub>
Incentive	% OHD	Reduction (metric tons)	Reduction (metric tons)	Reduction (metric tons)	Reduction (kilograms)
\$5,000	6.49%	101.196	24.047	3.004	20.29
\$10,000	14.10%	169.582	28.535	8.223	48.81
\$15,000	20.90%	202.749	39.972	11.824	69.99
\$20,000	25.34%	253.141	56.559	15.044	90.09
\$25,000	29.07%	383.813	55.764	26.333	149.86

# How the Adventure Ended...

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# A Huge Success...Widely Reported in the Press

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7/7/2010 New York to Ramp U  
 The New York City Department of Transportation has expanded deliveries, rather than peak-hour deliveries.  
 The pilot program, which ran from last September through July deliveries between 7 p.m. and 6 a.m. The DOT found that the parking, reduced congestion and significant savings. Business percent and a reduction in parking tickets and fines, which are  
 "New York is a city that never stops, and neither should its Khan. Time is money and this program is a signal to the entire delivers that also helps reduce congestion and pollution."  
 Freight deliveries into the borough exceed 100,000 daily, with The project was funded with a \$1.2 million grant from the Res 840,000 from the project, coordinator Rensselaer Polytechnic Rutgers University, New York University's Rudin Center for "A" Technologies  
 With less competition for parking spaces accessible to the de outside making deliveries. Instead of 100 minutes before the minutes faster during the pilot.  
 The project also focused on encouraging businesses to accept strategies to make the process easier, such as allowing "and direct delivery or for delivery to a holding area, saving money

**Fleets Say They Discovered Time, Cost Bonanza Through New York's Night-Delivery Experiment**  
 By Michele Fuetsch Staff Reporter  
 When Joe Killeen heard that New York City needed participants for its trial off-hours delivery program, he did more than volunteer his Kearny, N.J., trucking firm, New Deal Logistics. Killeen persuaded eight Foot Locker stores he supplies in Manhattan to volunteer, which meant the retail outlets agreed to substitute night deliveries for the daytime shoe shuttles New Deal normally runs under the Hudson River. "Instead of leaving here at 7 o'clock in the morning and spending an hour and a half trying to get through the Holland Tunnel, [trucks were] on the other side . . . in 25 minutes," Killeen said of the night trips. For carriers in the pilot program, which lasted from October 2009 through January 2010, the results were dramatic. Off-hour deliveries improved average travel speeds by as much as 75%, according to the analysis submitted to one of the program's funders, the Research and Innovative Technology Administration, or RITA, of the U.S. Department of Transportation. Adding to the off-hours benefit, data generated by Global Positioning System devices on the trucks showed that trucks delivering between 7 p.m. and 6 a.m. averaged 30 minutes at a receiver's site, compared with an average of 100 minutes during the day on streets clogged with traffic and lacking space to park. More than 100,000 truck deliveries, like this one on New York City every day. A pilot program tested and New Jersey raised its tolls in 2001. "Hitting truckers with tolls in hopes that they will induce change in receivers doesn't make sense in a competitive market like the one we have"

crain's

Article can be found at

**Nighttime**  
 City's Departmen  
 p.m. and 6 a.m.s

By **Jeremy Smerd**

Published: July 1, 20

It seemed like a no-br  
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 are continuing their n

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10 BIG IDEAS TRANSPORTATION  
**DELIVER**  
**A FIX FOR TRAFFIC JAMS**  
 BY JOSH SANBURN

**THE NEXT TIME YOU'RE STUCK** in traffic, blame all that stuff you buy online. E-commerce sales jumped 15% last year, to \$186 billion in the U.S., and the daily volume of shipments for FedEx and UPS has grown every year since 2009. Moreover, to keep pace with demand for faster deliveries, many of the rigs dispatched by Amazon, eBay and Fresh Direct leave before they're fully stocked. In other words, there are now more trucks, and more traffic, than ever. That increase helps explain why urban commuters waste at least 52 hours each year in stop-and-go jams, according to the Texas Transportation Institute. There are a number of ways to address this problem, including a push for off-peak delivery (see sidebar). But one of the most promising new solutions is actually an old idea: bikes. In recent years, a growing number of cities have welcomed such services, partly to help the environment and partly to skirt—and alleviate—congestion. For example, B-Line, based in Portland, Ore., works with companies like Office Depot to transport parcels via electric tricycles, which can carry up to 600 lb. (270 kg) of freight at a time. CEO Franklin Jones says his six-bike, 15-person company has replaced 20,000 truck and van deliveries since it started in 2009, and B-Line plans to expand to Seattle later this year. Similar companies have launched in Boston, Vancouver and London, where bike deliveries from UPS were essential during the crush of the 2012 Olympics. The most inventive option, however, comes from Brussels. Last September, courier TNT Express loaded packages into a mobile trailer during the middle of the night, then towed it to a place near a populated area (but out of traffic zones). Come daybreak, messengers on electric tricycles took the packages to their destinations. If implemented on a wider scale, the strategy could lead to fewer trucks, reduced costs per stop and lower CO<sub>2</sub> emissions. Although bikes can't fix delivery backups by themselves—they struggle with larger shipments—Hani Mahmassani, of Northwestern University's Transportation Center, sees their potential. "They're the best way to beat the traffic," he says.

**Bikes are great for delivering smaller packages, but what about the bulk items forcing trucks into rush-hour traffic? The answer, say most transportation experts, is simple: give businesses incentives to deliver during off-peak hours—perhaps to storage lockers like the ones Amazon offers. Here's how Manhattan could benefit if at least 20% of all package drop-offs occurred after 10 p.m., according to Jose Holguin-Veras of the Rensselaer Polytechnic Institute:**

- LESS CURBSIDE CLOGGING**  
 Drivers could save three to five minutes of travel time each day, thanks to fewer trucks that would drive and park along busy streets.
- LOWER PRICES**  
 Holguin-Veras estimates that trucking companies pay at least \$500 per truck each month in parking fines, which aren't levied at night. There's also less traffic after hours, meaning that trucks can get better gas mileage. Reducing that overhead would trim delivery costs across the board.
- MORE ECO-FRIENDLY VEHICLES**  
 Because they make less noise—crucial during night deliveries on residential streets—electric vehicles could become more attractive.

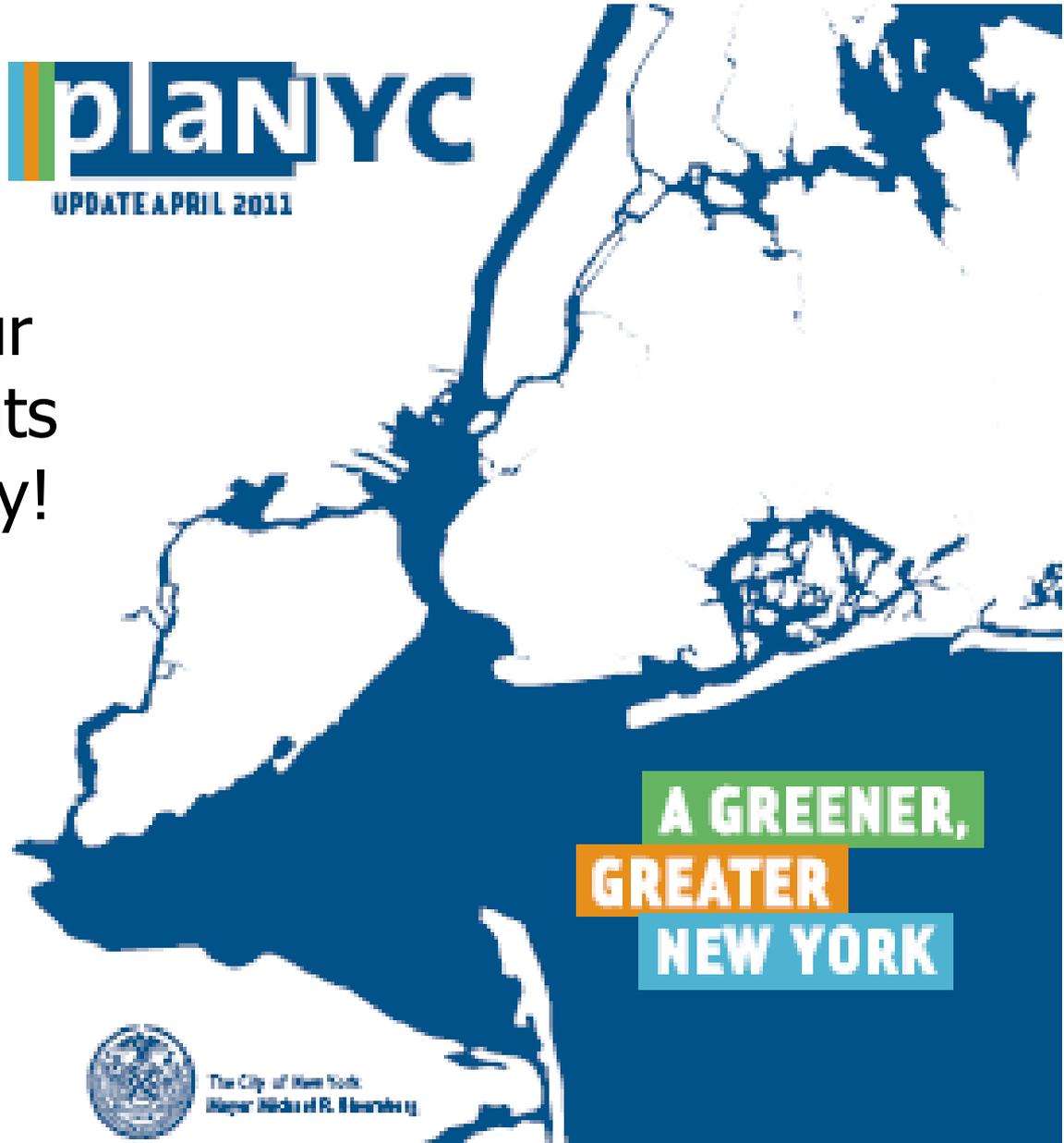
THE RIGHT DROP-OFF SOLUTION

**TIME** magazine listed the OHD project as a "Top 10 Ideas" March 25<sup>th</sup>, 2013

# The Impacts of the Project...



- ❖ NYC adopted off-hour deliveries as part of its sustainability strategy!



# The Impacts of the Project...

- ❖ In June 2012 the Federal Highway Administration (FHWA) and Environmental Protection Agency (EPA) issued \$450,000 in grants for small to medium size cities to implement off-hours goods movement /delivery programs based on the NYC pilot



U.S. Department of Transportation  
Federal Highway Administration

- ❖ Numerous cities are considering off-hour delivery programs: Boston, Washington, Atlanta, etc.

## ❖ ITS-NY (Intelligent Transportation Society) 2011 Project of the Year in Freight Management



## ❖ Numerous research awards:

- ❖ Robert E. Kerker Award
- ❖ Milton Pikarsky MS Award to Ms. Brenda Cruz
- ❖ Best Paper Award for UTC Region II
- ❖ Student of the Year Award to Mike Silas
- ❖ etc

# Ongoing Work

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# Ongoing work

- ❖ USDOT/RITA provided funds for a larger implementation project focusing on:
  - ❖ Unassisted deliveries:
    - ❖ Technologies/systems that enable OHD without the need for staff of the receiving business would produce the same benefits as regular OHD, at minimal cost
    - ❖ To address the liability concerns of receivers
  - ❖ Large Traffic Generators:
    - ❖ Large buildings/establishments generate hundreds of truck trips per day
      - ❖ About 80 such buildings → 4% of the truck traffic
      - ❖ Adding large establishments → 8% of truck traffic
    - ❖ They could implement OHD very cost effectively and without inconveniencing the receivers

# Chief conclusions

- ❖ Removing the constraints imposed by receivers (either by providing financial incentives, or using unassisted OHDs) works as it is
  - ❖ More effective than freight road pricing
  - ❖ A truly win-win-win-win-win policy:
    - ❖ Benefits regular hours travelers
    - ❖ Benefits the environment, improves quality of life
    - ❖ Benefits the business community, enhances economy
    - ❖ Noise impacts could be easily mitigated → electric trucks, low-noise truck technologies/practices
    - ❖ Benefits participants in OHD
  - ❖ Political appeal, implementable as a voluntary program

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