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FHWA E-bike Case Study Series

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New York City Supports Innovative Commercial Cargo Bicycle Pilot for Last-Mile Deliveries

New York City (NYC) is changing how New Yorkers get their packages by managing the largest cargo bicycle program in the country. On average, major freight delivery services deliver over 1.5 million packages in the city. In 2017, that amounted to 365 million tons of cargo. The New York City Department of Transportation (NYC DOT) projects that the amount of cargo entering, leaving, or passing through the city will rise to 540 million tons per day by 2045.[1] In one of the city's neighborhoods, East Midtown, larger box trucks (Class 5) deliver 64 percent of these parcels, placing a strain on street infrastructure.[2] Cargo electric bicycles (e-bikes) are a possible alternative vehicle type for deliveries to reduce injuries, congestion, and carbon emissions.

Cargo e-bike delivering packages in NYC. Image courtesy of NYC DOT.

In 2019, the NYC DOT's Freight Mobility Unit began testing a pilot program inspired by earlier programs in cities like Frankfurt, Germany and Utrecht, Netherlands to partner with freight delivery services to use cargo bicycles, including e-bikes, for deliveries.[3] The goal of the pilot program was to reduce congestion, improve safety by reducing on-street conflicts, and reduce greenhouse gas emissions. NYC has more than 1,400 miles of bike lanes that could be used for cargo e-bike deliveries. The city provided parking spaces for commercial cargo bicycles and training materials to operators in exchange

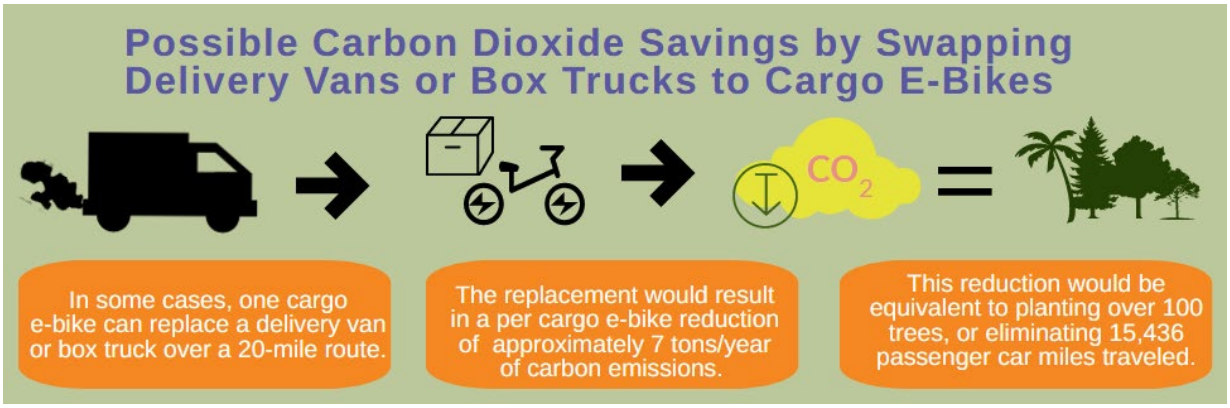
[1] Improving the Efficiency of Truck Deliveries in NYC, April 2019.
[2] Smaller trucks (Class 3) that are used by freight delivery companies accounted for around 24 percent, with the rest being made up by miscellaneous vehicles such as passenger cars and other utility trucks.
[3] NYC DOT is considering including throttle-based bikes and e-scooter trailer combos in the permanent program.

for travel data on deliveries. The pilot program benefitted New Yorkers by encouraging safer and more sustainable business-to-consumer deliveries.

Program Overview

The first freight delivery partners to participate in the NYC pilot program were Amazon, DHL, and UPS. The program launched with 100 pedal-assisted cargo e-bikes, with a maximum speed of 12 miles per hour. Soon after the pilot program started, additional companies joined, including FedEx, Reef Technology, and NPD Logistics. Since 2019, the fleets have grown to over 350 cargo e-bikes.[4] To participate in the program, companies followed pilot program guidelines and used newly constructed, specified cargo bike corrals to load and unload with the ability to charge their e-bikes on site. Participants in the pilot program were also allowed to load and unload in existing commercial metered zones at no cost. Based on population density, the program initially covered Midtown and Downtown Manhattan. The city expanded the program into Brooklyn and intends to expand the program to all its boroughs.

Most cargo e-bike deliveries occur on weekdays during daytime hours (9:00 AM – 5:00 PM with deliveries predominantly occurring during peak afternoon hours). Cargo e-bikes spend a short time (on average, 5 minutes or less) unloading deliveries at each address, which are usually on residential side streets. The city estimates that each bike makes four to eight trips per day. The program saw a 109 percent increase in cargo e-bike deliveries during the COVID-19 pandemic, with 21,000 trips occurring



Carbon emissions reductions resulting from the cargo e-bike pilot. Image adapted from NYC DOT Commercial Cargo Bicycle Pilot Evaluation Report.

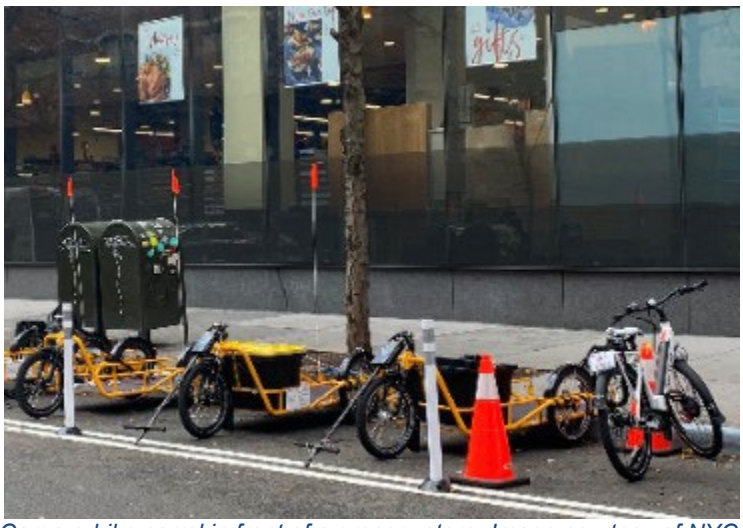
in May 2020 growing to 45,000 trips in January 2021. Most of this growth was due to the demand for grocery deliveries, but parcel deliveries have also increased, especially in residential areas. Each cargo e-bike covered an average of 20 miles per day, replacing delivery vans or box trucks at a rate of one to two cargo e-bikes per truck and reducing carbon emissions.

Providing the Infrastructure for Success

Safety is paramount and a critical component of NYC's program. According to the Commissioner of the NYC DOT, in 2018 and 2019, a disproportionately high number of cyclist fatalities have involved

[4] Commercial Cargo Bicycle Pilot: A New Mode for Last Mile Deliveries in NYC, May 2021.

trucks.[5,6] The cargo e-bike program presents an opportunity to reduce the number of delivery trucks operating within the city. NYC DOT requires that staff of companies participating in the pilot program attend safety training sessions prepared by city staff. Pilot program participants must also abide by safety requirements such as wearing reflective vests and knowing traffic safety rules. Since the beginning of the program, there have been no recorded incidents of crashes among the cargo e-bike participants.



Cargo e-bike corral in front of a grocery store. Image courtesy of NYC DOT.

NYC has committed to building cargo bike infrastructure to facilitate more seamless deliveries. On-street elements include cargo bike loading zones, which include flex posts and bike racks designated as a dedicated space to load and unload cargo. This space is available to participants of the pilot program at no extra cost. NYC DOT also plans to install signage at corrals to identify their locations and indicate that they are for cargo bicycle use. The NYC DOT sees potential in making the corrals even more convenient, safe, and efficient. Future innovative concepts for these spaces may include installing on-street charging stations for operators to use. The NYC DOT is also coordinating the expansion of protected bike and cargo bike lanes where possible.[7] Planning for the future bicycle network will consider the benefits of locating bike lanes near distribution hubs in order to incentivize last-mile delivery mode shift from trucks to cargo e-bikes.[8] In July 2022, NYC DOT released a Request for Expressions of Interest (RFEI) soliciting inputs from freight operators and other stakeholders to assist the city in establishing a pilot program to support micro-distribution centers in NYC. The RFEI sought information on land use and zoning restrictions impacting distribution hubs.

Key Takeaways

New York City's cargo bike program transitioned from a pilot program to an ongoing program in 2022. NYC DOT has goals of increasing enrollment in its cargo bike program to 2,500 bikes in 2026 and shifting 25 percent of last-mile freight deliveries from trucks to small, sustainable delivery methods by 2040. Key takeaways from the program include:

Density impacts program effectiveness. Despite expansion into Brooklyn, around 94 percent of the deliveries occur in denser portions of Manhattan. Participating companies need to make sure cargo e-bikes are efficient and cost effective. Denser locations allow cargo bikes to make many deliveries over

[5] Mayor de Blasio Announces Commercial Cargo Bike Program to Reduce Delivery Congestion, December 2019.
[6] 21 of the 37 cyclist deaths in 2018 and 2019 involved trucks and vans, and 17 of these deaths involved large trucks.
[7] Green Wave: A Plan for Cycling in New York City, July 2019.
[8] Commercial Cargo Bicycle Pilot: A New Mode for Last Mile Deliveries in NYC, May 2021.

a small area, whereas delivery trucks must contend with traffic and parking. In less dense areas, it is often more cost effective to use a truck to travel the longer distances between delivery addresses. Cities exploring cargo e-bike programs may want to strategically focus on the denser portions of their jurisdiction.

Standardized data collection supports decision making. To participate in the program, companies monitored and shared global positioning system (GPS) trip data with NYC DOT.[9] NYC DOT used the data to inform future policy changes regarding cargo e-bike usage. An important lesson learned was to start the data collection process with a dedicated template in mind. Initially, the city wanted the data collection to be convenient for operators so it would not be a barrier to entry into the program. However, the city received different formats of data sources from different providers, which created additional effort to manage and standardize the information. Eventually, NYC will use a micromobility data standard similar to the General Transit Feed Specification (GTFS) to streamline data maintenance.

Regulatory alignment sets the stage for private sector success. In April 2020, as NYC was piloting its cargo e-bike program, the State of New York legalized the use of all e-bike classifications. Previously, only pedal-assist e-bikes with a top speed under 20 m.p.h. were permitted with registration. However, the legislation established a maximum e-bike width of 36 inches. Cargo bikes greater than this standard are required to operate on travel lanes and cannot operate in bike lanes. This change significantly impacted freight delivery fleets since many parcel compartments have a wider design than the regulated specification. An effort is underway to amend the law to accommodate e-bikes up to 48 inches in width. Managing a cargo e-bike public-private partnership requires coordination among different public sector authorities. Participating companies in cargo e-bike programs should seek regulatory clarity from all jurisdictions in which they intend to operate. Likewise, municipalities should strive to provide regulatory certainty for private sector freight delivery partners.

Other Noteworthy Practices

Miami partnered with a freight delivery company and mobility logistics hub to pilot four cargo e-bikes. The e-bikes are tricycles with cargo containers capable of pulling up to 400 pounds. The city and partners expect that the replacement of trucks with these e-bikes will result in a reduction of 112 tons of carbon dioxide emissions per year.

Boston launched a cargo e-bike pilot in the summer of 2022. Between 2010 and 2018, online purchases in the metro area grew by more than 90 percent, further straining the narrow streets used by delivery trucks in the city. In preparation for the pilot, the city is investigating different cargo e-bike delivery models that provide the most impact while realizing the city's goals for mobility, safety, and sustainability. The request for information initiating this pilot referenced NYC's cargo e-bike program as a case study.

[9] Mayor de Blasio Announces Commercial Cargo Bike Program to Reduce Delivery Congestion, December 2019.