



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Monica Tibbits-Nutt, MPO Chair | Secretary and CEO, Massachusetts Department of Transportation
Tegin Leigh Teich, Executive Director, MPO Staff

WORK PROGRAM

EXPLORING THE POTENTIAL OF CARGO E-BIKES FOR FIRST- AND LAST-MILE FREIGHT DELIVERIES

OCTOBER 24, 2024

Proposed Motion

The Boston Region Metropolitan Planning Organization (MPO) votes to approve this work program.

Project Identification

Unified Planning Work Program (UPWP) Classification

Boston Region MPO Planning Studies and Technical Analyses

Project Number 13821

Client

Boston Region MPO

Project Supervisors

Principal: Rounaq Basu

Manager: Shravanthi Gopalan Narayanan

Funding Source

UPWP New MPO Funded Discrete Studies for Federal Fiscal Year (FFY) 2025 and Combined 3C PL and §5303 funding

Schedule and Budget

Schedule: Ten months after work commences

Budget: \$40,000

Schedule and budget details are shown in Exhibits 1 and 2, respectively.

Relationship to MPO Goals

The Boston Region MPO elected to fund this study with its federally allocated metropolitan planning funds during federal fiscal year (FFY) 2025. The work completed through this study will address the following goal areas established in the MPO's Long-Range Transportation Plan: safety, capacity management and mobility, clean air and clean communities, and transportation equity.

Background

In FFY 2024, MPO staff worked on a discrete study, *Sustainability and Decarbonization in the Freight and Logistics Sector in the North Suffolk Area*, that gained interest from various stakeholders. As a follow-up to this discrete study, the MPO board voted to pursue another discrete study titled *Exploring the Potential for Using Cargo E-Bikes for First- and Last-Mile Freight Deliveries* in FFY 2025.

Globalization coupled with a post-pandemic surge in online shopping has heightened our dependence on freight deliveries. This has led to an increase in trucks, both step vans and medium-sized delivery vehicles, passing through and stopping in neighborhoods and raising safety concerns for the residents while placing strain on municipalities due to wear and tear on roadways. To address this emerging trend, many regions in the U.S. and around the world are exploring alternative local delivery systems, such as establishing neighborhood freight hubs or micro-hubs (*referred to collectively as “hubs” in this document*) for larger freight vehicles to transfer goods to cargo e-bikes for the first- and last-mile deliveries. In addition to substituting for “traditional” freight deliveries, cargo e-bikes are also being considered as a promising alternative to food deliveries made by people driving cars.

The City of Boston, in partnership with Net Zero Logistics, is conducting a pilot program called [Boston Delivers](#) to support local businesses in Allston and surrounding areas. Building on this recent effort, MPO staff will explore the characteristics of cargo e-bikes and the potential for using them for the first- and last-mile deliveries across the Boston metropolitan region. MPO staff will also explore the role of hubs in the regional transportation system. This research could offer valuable insights into strategies for decarbonizing the freight sector while addressing the concerns of residents and municipalities.

Objectives

1. Identify past, ongoing, and/or planned cargo e-bike pilots and other similar programs across the country for takeaways from their efforts.
2. Interview key personnel involved in these initiatives to uncover challenges and opportunities.
3. Discuss the role of hubs, including the function of hubs and infrastructure needs, in the delivery process.
4. Identify municipalities in the Boston metropolitan region that are interested in exploring and piloting cargo e-bikes, and discuss the challenges and strengths of a potential pilot program.
5. Provide recommendations on best practices and key considerations for implementing cargo e-bikes and establishing hubs.

Work Description

This study will investigate how cargo e-bikes support first- and last-mile deliveries and discuss the efficiency of these vehicles for making deliveries. The study's tasks include conducting a comprehensive literature review, interviewing stakeholders and analyzing interview data through a thematic analysis, identifying municipalities with strong potential and interest to carry out pilots with cargo e-bikes, and providing recommendations and best practices for the Boston metropolitan region. Additionally, the study will propose a toolkit or framework to guide municipalities interested in piloting cargo e-bike programs.

Task 1 Literature Review

This study will gather relevant information available on existing and past cargo e-bike initiatives for the first- and last-mile connections. The literature review will yield information about different types of cargo e-bikes and the regulatory framework governing their use, including state traffic laws, vehicle codes, safety measures, equity and sustainability. Additionally, staff will examine programs that promote bike ownership and offer incentives for using cargo e-bikes. Consideration will also be given to the range of products (such as take-out food, groceries, online orders of small quantities of goods, etc.) delivered depending on the vehicle size.

Staff will explore the role of logistics hubs in the delivery process, focusing on activities performed at hubs, such as sorting, organizing, and dispatching deliveries. Staff will also investigate the management structure of delivery systems, including the ownership of bikes, logistics, hub locations, partnerships, and staffing, whether through hiring drivers or leasing bikes.

Staff will also analyze operational flows such as limited driving range and smaller cargo capacity and infrastructure needs, such as secure storage, charging stations and battery life, staging areas, dedicated loading zones, and appropriate bike designs and facilities. Lastly, staff will propose screening criteria for establishing hubs to ensure that the demand for necessary hubs are met.

Products of Task 1

A technical memorandum prepared in Task 5 will include a section on literature review with a bibliography.

Task 2 Spotlight of Selected Case Studies

MPO staff will explore challenges, solutions, and best practices for this topic through case studies focused on related policies, regulations, and incentives, examining how cargo e-bikes have been used in various settings and for different purposes. The study will focus on the benefits of cargo e-bikes, such as improving safety, reducing carbon emissions, and alleviating urban congestion.

Potential locations for case studies include Boston, Seattle (Seattle Department of Transportation and UW Urban Freight Lab), New York City, Miami, Montreal, and Toronto.

Products of Task 2

A summary of themes from the case studies will be discussed in the memorandum prepared in Task 5.

Task 3 Interview Key Personnel

MPO staff will interview key personnel with relevant experience such as experts from comparable case studies. Tasks will include preparing a questionnaire, reaching out to agencies to schedule meetings, and conducting interviews.

Subtask 3.1 Analyze Takeaways

Staff will perform a thematic analysis to evaluate key takeaways from the interviews.

Products of Task 3

A list of interviewees will be included in the appendix, and the analyzed interview takeaways will be presented in the memorandum prepared in Task 5.

Task 4 Study Findings and Recommendations

The memorandum will document the study's findings based on the various methodologies used. These findings will inform considerations for establishing hubs and utilizing cargo e-bikes for first- and last-mile deliveries across the Boston metropolitan region.

Subtask 4.1 Best Practices

Staff will summarize the best practices learned from the literature review, case studies, and interviews, and propose a toolkit or framework as a guide to municipalities that are interested in piloting cargo e-bikes.

Subtask 4.2 Study Recommendations

Recommendations specific to the Boston metropolitan region will be formulated.

Subtask 4.3 Funding and Grant Opportunities

Staff will briefly discuss possible funding sources and partnership opportunities for cargo e-bike pilot programs.

Products of Task 4

The memorandum prepared in Task 5 will include a summary of best practices and recommendations derived from the study's findings.

Task 5 Finalize Study and Present to the MPO Board

Staff will produce final work products that will be reviewed internally, presented to the MPO board, and shared with the public.

Subtask 5.1 Present to MPO

MPO staff will prepare a memorandum with sections on all the products discussed above, and a PowerPoint presentation highlighting the key points from the memorandum to present to the MPO.

Products of Task 5

Final deliverables will include a project memorandum and a PowerPoint presentation. The memorandum will be published on the Boston Region MPO's website.

Exhibit 1
ESTIMATED SCHEDULE
EXPLORING THE POTENTIAL FOR USING CARGO E-BIKES FOR FIRST- AND LAST-MILE FREIGHT DELIVERIES

Task	Month										
	1	2	3	4	5	6	7	8	9	10	
1. Literature review	A										
2. Spotlight of selected case studies		B									
3. Interview key personnel			C								
4. Study findings and recommendations						D					
5. Finalize study and present to the MPO									E		

Products/Milestones

- A: Technical memorandum
- B: Summary of themes from the case studies
- C: List of interviewees
- D: PowerPoint presentation to MPO board

Exhibit 2

ESTIMATED COST

EXPLORING THE POTENTIAL FOR USING CARGO E-BIKES FOR FIRST- AND LAST-MILE FREIGHT DELIVERIES

Direct Salary and Overhead **\$39,930**

Task	Person-Weeks by Pay Grade				Direct Salary	Overhead (120.3%)	Total Cost
	G-9	G-8	G-5	Total			
1. Literature review	0.0	0.0	2.0	2.0	\$2,704	\$3,253	\$5,957
2. Spotlight of selected case studies	0.0	0.0	2.0	2.0	\$2,704	\$3,253	\$5,957
3. Interview key personnel	0.0	0.0	3.0	3.0	\$4,056	\$4,879	\$8,935
4. Study findings and recommendations	0.1	0.1	3.5	3.7	\$5,205	\$6,262	\$11,467
5. Finalize study and present to the MPO	0.1	0.1	2.2	2.4	\$3,456	\$4,158	\$7,614
Total	0.2	0.2	12.7	13.1	\$18,125	\$21,804	\$39,930

Other Direct Costs **\$0**

TOTAL COST **\$39,930**

Funding

MPO §5303 Planning Contract #126734

CIVIL RIGHTS NOTICE TO THE PUBLIC

Welcome. Bem Vinda. Bienvenido. Akeyi. 欢迎. 歡迎



You are invited to participate in our transportation planning process, free from discrimination. The Boston Region Metropolitan Planning Organization (MPO) is committed to nondiscrimination in all activities and complies with Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national origin (including limited English proficiency). Related federal and state nondiscrimination laws prohibit discrimination on the basis of age, sex, disability, and additional protected characteristics.

For additional information or to file a civil rights complaint, visit www.bostonmpo.org/mpo_non_discrimination.

To request this information in a different language or format, please contact:

Boston Region MPO Title VI Specialist

10 Park Plaza, Suite 2150

Boston, MA 02116

Phone: 857.702.3700

Email: civilrights@ctps.org

For people with hearing or speaking difficulties, connect through the state MassRelay service, www.mass.gov/massrelay. Please allow at least five business days for your request to be fulfilled.