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Routes to Sustainable Goods Movement: How Local and Regional Governmental Agencies Can Plan for the Sustainable Freight System of the Future

Project 2419
June 2026

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Introduction

Freight transportation supports nearly every aspect of daily life. Trucks, rail, ports, and distribution systems move food, medical supplies, consumer goods, and construction materials across metropolitan regions. At the same time, freight systems contribute significantly to congestion, emissions, safety risks, and infrastructure wear. These impacts are often concentrated in low-income and environmentally burdened communities. As freight demand continues to grow through e-commerce expansion, population growth, and increasingly complex supply chains, local and regional governments face mounting pressure to plan for freight systems that are not only efficient, but also sustainable, resilient, and equitable.

This research examines how metropolitan regions across the U.S. are planning for sustainable freight transportation. The study analyzes freight plans from eight major metropolitan regions and interviews freight professionals to identify common strategies, implementation approaches, emerging trends, and persistent barriers. The goal is to provide local and regional agencies with practical guidance for improving freight planning while supporting climate, safety, equity, and economic development objectives.

Study Methods

The research used a qualitative, multi-method approach that combined document-based content analysis with interviews of freight planning professionals and subject-matter experts. First, the research team collected and analyzed freight and goods movement planning documents from eight major metropolitan regions: Baltimore, Boston, Charlotte, Atlanta, Chicago, Los Angeles, Seattle, and the San Francisco Bay Area. These regions were selected because they represent a range of freight functions, including major ports, rail hubs, inland logistics centers, and multimodal transportation gateways. The plans reviewed were published between 2013 and 2024 and included freight master plans, technical reports, regional mobility plans, and policy memorandums.

The research team then conducted a systematic content analysis to identify recurring freight planning themes. Each document was reviewed and coded based on categories such as freight planning strategies, implementation measures, environmental sustainability, resilience, equity, congestion, multimodal transportation, stakeholder collaboration, and economic competitiveness. Rather than counting how often specific terms appeared, the analysis focused on whether and how concepts were addressed across planning documents.

To complement the document review, the research team conducted interviews with freight planning professionals involved in freight system planning, implementation, and policy development. Interviewees included planners, consultants, researchers, and transportation professionals with expertise in freight mobility and sustainable transportation. The interviews explored implementation barriers, freight data limitations, resilience planning, stakeholder coordination, emerging technologies, and opportunities for improving freight planning practices. The findings from the content analysis and interviews were synthesized to develop a practical toolkit of strategies and recommendations for local and regional freight planning agencies.

Findings

The study found that many metropolitan regions are increasingly incorporating sustainability, resilience, and multimodal thinking into freight planning. However, implementation remains uneven, and many regions continue to face institutional, financial, and data-related barriers. One of the strongest themes across plans was the emphasis on freight corridor planning and multimodal connectivity. Many regions prioritized improvements to truck routes, rail access, intermodal terminals, and port connections to reduce congestion and improve freight reliability. Freight plans frequently included strategies such as rail modernization, truck parking improvements, freight network designation, and intermodal coordination.

The research also found growing interest in environmental sustainability strategies, including zero-emission freight vehicles, alternative fuels, electrification, and emissions reduction programs. More recent plans were more likely to discuss climate resilience and adaptation following supply chain disruptions associated with the COVID-19 pandemic and extreme weather events. However, resilience planning often lacked detailed implementation frameworks.

Equity emerged as an important but inconsistently addressed topic. While many plans acknowledged impacts to disadvantaged communities, relatively few included measurable equity-focused freight strategies or accountability measures.

Interviews revealed that freight data remains one of the largest barriers to effective local and regional planning. Freight data is often expensive, proprietary, incomplete, or difficult to apply at the neighborhood scale. Practitioners also emphasized that freight projects frequently compete with passenger transportation investments for funding and political attention. Another major finding was the importance of collaboration. Successful freight planning depended heavily on partnerships among metropolitan planning organizations, ports, railroads, trucking firms, state agencies, and community stakeholders.

Policy/Practice Recommendations

The findings suggest that local and regional agencies should pursue freight planning using a more integrated framework that balances economic competitiveness with sustainability, resilience, safety, and equity goals. First, agencies should strengthen freight data collection and sharing practices. Better local freight data can improve project prioritization, performance measurement, and community impact analysis. Second, freight planning should more explicitly integrate equity and environmental justice considerations into project development and implementation. This includes identifying communities disproportionately affected by freight activity and incorporating measurable equity outcomes into freight investment decisions.

Third, agencies should continue expanding multimodal freight strategies that improve coordination between truck, rail, maritime, and last-mile delivery systems. Investments in rail modernization, intermodal infrastructure, and zero-emission technologies can reduce congestion and emissions while improving freight efficiency. Finally, the study highlights the importance of sustained stakeholder collaboration. Agencies should strengthen regional partnerships, institutionalize freight advisory committees, and engage community stakeholders early in the planning process.

About the Authors

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To Learn More

For more details about the study, download the full report at https://transweb.sjsu.edu/research/2419

MTI is a University Transportation Center sponsored by the US Department of Transportation, the California Department of Transportation, and public and private grants, including those made available by the Road Repair and Accountability Act of 2017 (SB1). The Institute is part of San José State University's Lucas Graduate School of Business.