

## Helping Transit Agencies Assess Opportunities to Improve Access and Equity With Automated Vehicles

**Purpose:** To develop a replicable, open, deployable model which can (1) identify unmet service need based on transit dependence, low income and minority status and (2) conduct a cost analysis on the feasibility of operating shared automated vehicles and shuttles as a part of a public transit system.

**Approach:** Four cities were chosen for this study to capture different size cities and public transportation systems in the various geographic regions in the United States. Transit stops, routes, and service frequency data from the standardized General Transit Feed Specification were used to determine the transit supply score for each census block group. The transit coverage score is determined using the transit supply score and transit need score revealing current service available to the transit-dependent population. Levelized costs for operating each mode in each city are estimated across multiple scenarios to provide insight into the cost efficiency of different transit planning futures.

### Key Findings:

- ✓ The low-income population accounts for 37% of the total population in any New York City's Census Block Group (CBGs). It increased to 49% when looking at areas with low transit coverage.
- ✓ Lack of service considerably limits individuals in low transit coverage CBGs from jobs, education, and social opportunities and diminishes transit equity in NYC.
- ✓ In Chicago, transit coverage improved by 24% with an electric, autonomous shuttle fleet in CBGs.
- ✓ Over 70% of the transit-dependent population in each city lives in CBGs with high proportions of low-income, minority populations, and low transit coverage.
- ✓ Minneapolis-St. Paul, Pittsburgh, and Chicago follow similar spatial patterns where transit coverage is highest in the centers of the city and decreases once beyond city boundaries.

**Conclusion:** While autonomous shuttles were more cost efficient than buses in Minneapolis and Pittsburgh, in many NYC and Chicago CBGs, buses were better. The analysis supports studies that caution against replacing all public transportation with robo-taxis. There are certain conditions where robo-taxis can complement public transit and other conditions where it is still most cost-efficient to add transit access with more conventional modes like a bus.



### Research Team:

Costa Samaras (Principal Investigator)

<https://orcid.org/0000-0002-8803-2845>

### Project Record:

<https://ppms.cit.cmu.edu/projects/detail/336>

### Follow Us:

 [www.facebook.com/traffic21.tset](https://www.facebook.com/traffic21.tset)

 @Traffic21CMU

The contents of this Research Recap reflect the views of the final research report authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the U.S. Department of Transportation's University Transportation Centers Program, in the interest of information exchange.

The U.S. Government assumes no liability for the contents or use thereof.