

Research at a Glance

Technical Brief

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Analysis of Local Bus Markets, Phase III

Despite having an extensive network of public transit, traffic congestion and transportation-related greenhouse gas (GHG) emissions are significant concerns in New Jersey. This research examines the GHG impacts of NJ TRANSIT local buses in the greater Newark area service region. It involved a large-scale onboard survey of bus riders on 40 NJ TRANSIT routes serving Newark, New Jersey and surrounding areas. Data collected through the survey were used to estimate how many riders would travel by automobile modes in the absence of buses and how much GHG would be generated from the diversion of bus riders to automobile modes.

Research Problem Statement

NJ TRANSIT runs bus operations on more than 250 routes throughout New Jersey. Buses on such a large number of routes are expected to have an effect on both traffic congestion and GHG emissions since many of the current riders would have traveled by automobile if buses on these routes did not operate. To estimate the amount of GHG that would be generated by such diversions, an origin-destination survey of bus riders was undertaken. Although NJ TRANSIT periodically conducts onboard surveys of bus riders to collect data for forecasting and service planning, such surveys have not been conducted for some routes for over ten years. Through this study, data from 40 bus routes was collected via an on-board intercept survey. The collected data are useful for multiple purposes, including forecasting, service planning, and the estimation of GHG impacts of buses.

Research Objectives

This research had three primary objectives:

- Assess the GHG impacts of local buses.
- Assess the characteristics of riders and their travel patterns.
- Generate a dataset of riders through a survey that can be used to answer the research questions of this study and also assist NJ TRANSIT with future service planning and forecasting.



Photo credit: NJTV News

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Methodology

To achieve these objectives, the research team: designed and implemented an on-board customer intercept survey over multiple seasons, including Fall 2019, Fall 2021, and Spring and Fall 2022. Surveys were conducted between 6 AM and 4 PM onboard all buses for 40 routes in the greater Newark, New Jersey service area. After the survey was complete, the research team entered, cleaned, weighted, and analyzed the survey data. Data was collected from 8,663 riders. Data from the survey was used to develop profiles of each surveyed bus route highlighting rider characteristics and use patterns and to estimate the impact of local buses on GHG emissions.

Results

Data from the study demonstrated the important role local buses play in providing mobility and access to opportunity for minority, low-income, and car-less households. The share of low-income and minority bus riders is far greater than the share of these populations in New Jersey as a whole. Local buses provide mobility to a large number of New Jersey residents who have no other means of travel. Many of those residents use buses to travel to work. By connecting workers to job locations, local buses play an important role in New Jersey's economy.

A large proportion of NJ TRANSIT local bus riders (78 percent) regularly use app-based rideshare services such as Uber and Lyft. About 20 percent report taking more than 20 trips in the last 30 days. This high level of use would seem to indicate that app-based services may compete with buses. However, among riders that reported using an app-based service in the last 30 days, a clear majority (61 percent) of bus riders reported using transit more because of app-based services, while far fewer riders reported that TNCs either did not change their use of transit (27 percent) or that they use transit less because of app-based services (12 percent). This result would indicate that at least to some extent, app-based services complement local buses.

The analysis of emissions impact of buses confirmed that the use of buses instead of alternative automobile modes generates a large reduction in CO₂ emissions. The analysis showed, based on one-way trips alone, 33,174 metric tons of CO₂ would be generated annually from automobiles if the riders traveled by automobile instead of bus. It would take almost 7,211 automobiles to operate for a full year to generate that much emissions. Considering that the vast majority of riders surveyed stated that they take the bus in both directions for their trips, the total CO₂ emissions saved by the buses is likely to be much higher than the estimate provided above.

