December 2018 **FHWA-NJ-2018-010**

New Jersey Department of Transportation
Bureau of Research

Technical Brief

Analysis of Local Bus Markets – Phase II

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 transit by exclusively focusing on local buses in selected parts of the state. It involved a large-scale onboard survey of bus riders on 25 NJ TRANSIT routes serving Burlington, Hudson, Middlesex, and Monmouth Counties. 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.

Background

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 is necessary. 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. This research helped to collect data from 25 of those routes through a rider survey so that the data could be used for multiple purposes, including forecasting, service planning, and the estimation of GHG impacts of buses.

Research Objectives and Approach

This research had three primary objectives:

- Assess the GHG impacts of local buses by examining how much emissions would have been generated if bus riders deviated to cars.

- 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.

Pertaining to these objectives, several tasks were undertaken: designing and organizing a survey involving approximately 50 surveyors over two seasons; conducting the survey between 6 AM and 4 PM onboard all buses for 25 routes; cleaning and analyzing survey data collected from 3,795 riders; estimating local buses' GHG impacts; and writing a final report describing the various tasks and research results.

Findings

- Based on one-way trip alone, more than 6,175 metric tons of CO_2 would be generated annually from automobiles if bus riders of the 25 routes diverted to that mode. It would take around 1,314 automobiles to operate for a full year to generate that amount of emission.

- In addition to having substantial GHG impacts, the local buses provide highly equitable service as they serve a very high proportion of persons from minority, low-income, and car-less households. The share of low-income and minority bus riders is far greater than the share of such populations in New Jersey as a whole and also the areas where buses operate.

- 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.

For More Information Contact:

NJDOT Project Manager:	Priscilla Ukpah
	609-530-5157
	Priscilla.Ukpah@dot.nj.gov
Principal Investigator:	Devajyoti Deka, Ph.D.
	Alan M. Voorhees Transportation Center
	Rutgers, The State University of New Jersey
	(848) 932-2875
	ddeka@ejb.rutgers.edu

A final report is available online at: http://www.state.nj.us/transportation/refdata/research/. If you would like a copy of the full report, send an e-mail to: Research.Bureau@dot.state.nj.us.

Analysis of Local Bus Markets Phase II, NJDOT Research Report No: FHWA-NJ-2018-010