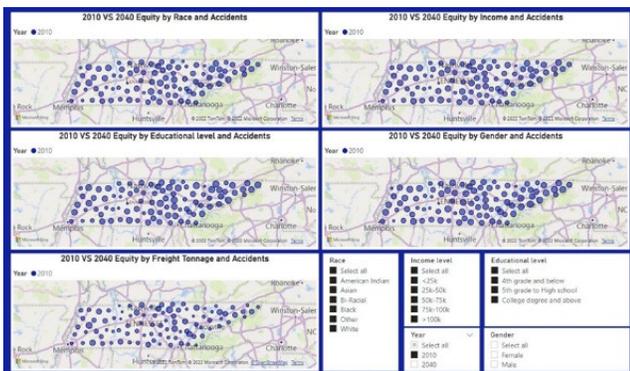




## Research Summary

# Understanding Freight Impacts on Tennessee Communities



### WHAT WAS THE RESEARCH NEED?

Tennessee's economy is considered a goods-dependent industry with most goods moved by trucks on a roadway network that consists approximately of 73 percent of rural roadways, and 77 miles designated as critical rural freight corridors. Even though urban areas have received most of the attention, freight movements and their impacts on rural areas cannot be overlooked especially for the state like

Tennessee. Rural areas can be the lifeline of several freight industries, and, if not adequately supported, can lead to a disproportionate increase of freight-related externalities to the local communities. This research developed a suburban/rural community-focused freight impact and mitigation guidebook for the State of Tennessee.

### WHAT WERE THE RESEARCH OBJECTIVES?

The study had multiple research objectives that are all focused toward achieving the common goal of developing guidance for transportation planners, engineers, and practitioners at local/regional agencies and TDOT. Most notably, this study aimed to identify and evaluate alternatives for freight investment to simultaneously improve freight movements and quality of life of the communities they serve.

### WHAT WAS THE RESEARCH APPROACH?

During this study, various freight movement related externalities were identified from an exhaustive literature

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review. The research team used various available (proprietary and public) datasets to quantify (where possible) freight movement externalities at the county and traffic analysis zone (TAZ) level. The project also developed online and desktop tools that provide data analytics capabilities to identify high freight intensity and externalities areas, areas of low equity, and the mitigation strategies that can be implemented to alleviate the effects of these externalities. The mitigation strategies and their ranking are based on effectiveness, cost, and implementation difficulty and vary by mode.

## **WHAT WERE THE FINDINGS?**

The key findings of the research include:

- A high number of mitigation strategies exist with varying levels of effectiveness, cost, and implementation difficulty that vary by mode and externality.
- The mitigation strategies identified, usually, address more than one externality at the same time and were qualitatively ranked to capture their potential.
- Environmental impacts mitigation and noise were the most and least researched topic respectively.
- African American and Asian population groups are the most inequitable when it comes to freight movements.
- Equity by freight movements does not show any significant difference between genders and income levels (except for emissions for the income categories).
- Low educational levels (4th grade and below) showed a low equity index for all externalities.
- Freight movement equity differences between counties in Tennessee vary significantly ranging from a maximum of approximately 0.8 to a minimum of 0.02 (with a value of one corresponding to perfect equity).

## **IMPLEMENTATION AT TDOT**

The research provides TDOT personnel, as well as local transportation agencies, with a ready and easy-to-use guidebook supported by various data analytic tools that streamline the tasks of identifying, taxonomizing, and ranking strategies (based on cost, benefits, and barriers to implementation) to improve freight transportation and minimize/mitigate the externalities they cause. The developed guidebook and tool support planning, tactical, and operational freight improvements at the state and local level that simultaneously optimize freight movements and minimize their externalities (e.g., environmental, congestion, health) to the communities they serve. Additionally, the proposed tools can help identify areas (county and TAZ level) of low equity for different population groups that can then lead to more targeted actions that promote equity (in addition to freight movement externality reduction).

## **MORE INFORMATION**

Find the final report here: [https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/res2021-final-reports/RES2021\\_07\\_Final\\_Report\\_Approved.pdf](https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/res2021-final-reports/RES2021_07_Final_Report_Approved.pdf).