

RES2016-33: FUELS, FREIGHT AND THE TENNESSEE ECONOMY

Mark Burton Center for Transportation Research, The University of Tennessee
mburton3@utk.edu

INTRODUCTION AND MOTIVATION

The emergence of previously unrecoverable natural gas and petroleum resources is transforming the world of freight. Coal volumes, as a source of rail and waterway traffic have declined by one-third, with further declines predicted. This has placed huge strains on both eastern railroads and water carriers. At the same time, seemingly permanent lower natural gas prices are generating vast investments in new chemical and plastics manufacturing capacity – capacity that will eventually require freight movement. Finally, the effects of new fuel production have been further complicated by an international response that has driven crude petroleum to as low as \$30 per barrel and on-road diesel prices to a seven-year low of \$2.01 per gallon.¹

These changes are rapidly altering the landscape faced by Tennessee's DOT. Motor Fuel (diesel) tax revenues are the second largest form of highway revenues. Fuel prices are major component in highway construction costs. Fuel-dependent distribution activities are a key determinant of localized roadway demands and, at least in the eastern portion of the state, diminished coal transport threatens the availability of both railroad and waterborne freight services.² Fashioning a freight policy response to this new, fuel-related landscape is unavoidable.

RESEARCH PROGRAM

The large number of complex relationships between fuel markets and freight in Tennessee could generate a variety of useful research responses. However, here, we propose a focus on just three such topics. First, the research team will attempt to predict how fuel-induced changes to freight demands and usage are likely to affect Motor Fuel Tax and Transportation Equity Fund revenues, both in a short-run and long-run setting. This analysis will build on the established Tennessee Revenue Analysis and Modeling System (TRAMS) which was developed to support motor fuel revenue forecasting. Second, we will explore how fuel-related declines in coal transportation are affecting the availability of and access to railroad and navigation freight services and the extent to which this may affect corresponding demands for state-level support for this modal access. Finally, we will investigate how changing fuel prices and related behaviors affect the demands for last-mile freight access in Tennessee communities and the corresponding nature of community freight planning. Specific topic-related tasks are described below

MOTOR FUELS AND TRANSPORTATION EQUITY FUND TAX REVENUES

Because Tennessee's fuels-related taxes are levied as per-gallon excise taxes, estimating changed revenues requires three specific tasks. These include:

¹ Current crude oil prices have now increased to approximately \$48 per barrel. (5/23/16).

² In October of last year CSX Transportation closed shop facilities at Erwin, Tennessee, curtailed rail service north of Kingsport, and substantially reduced service from Kingsport southward into South Carolina, resulting in the elimination of 300 full-time positions. In April of this year Norfolk Southern (NS) ceased operations at Knoxville's John Sevier Yard, eliminating an additional 135 positions. Both actions were linked to reduced coal volumes.

1. Determination of fuels-related, mode-specific traffic scenarios for freight movements to, from, and through Tennessee;³
2. Estimation of changed fuel consumption by mode based on freight traffic scenarios; and
3. The calculation of corresponding revenue changes under Tennessee's existing Motor Fuel and Transportation Equity Fund tax structures.⁴

RAILROAD AND WATERWAY FREIGHT ACCESS IMPACTS

Currently, the region's Class I railroads are developing and executing strategies designed to assure their financial viability in the face of fuels-related changes in freight traffic. In some cases, this will result in down-graded route segments and correspondingly slower train speeds. These same strategies are also likely to result in the sale or lease of route segments to short-line railroad operators. Finally, in some cases, Class I strategies may involve route abandonments. With regard to navigation, the most likely access issues revolve around continued support for commercial navigation on the Tennessee and Cumberland Rivers. The study team will report quarterly on any such changes within Tennessee or contiguous states. These reports will also describe state or regional responses to diminished rail or waterway access diminished elsewhere.

FUEL-RELATED IMACTS ON METROPOLITAN, LAST-MILE FREIGHT

The primary impacts on last-mile freight within more densely populated communities will likely come through two sources – (1) long-run changes in retail gasoline and diesel fuel prices and (2) changed land use patterns resulting from diminished rail and waterway land use requirements in these areas. Generally, lower fuel prices may be expected to increase personal vehicle use and diminish required last-mile freight access, while reduced competition by industrial users for available metropolitan properties may make it easier for communities to accommodate alternative last-mile freight practices that improve this access.

These two last-mile scenarios are very different in their root causes and must be evaluated separately. In both cases, however, gleanings Tennessee-specific information can be accomplished by combining known (or forecasted) Tennessee-specific, fuels-related freight changes with nationally derived estimates of the relationships between fuel prices, consumer behaviors, and metropolitan land-use.⁵

SCHEDULE, BUDGET, AND DELIVERABLES

Dr. Mark Burton will serve as the overall Principal Investigator for this proposed research component. However, a portion of the required activities will also be conducted / supervised by Drs. David Clarke and Matthew Murray. A task-specific budget, schedule, and indication of deliverables, are provided in the tables that follow. All dates are based on a start date of October 1, 2016, but may be adjusted as necessary.

³ Scenarios will be based on location-specific coal consumption forecasts provided by TVA and other regional utilities that currently consume coal that passes through Tennessee. Scenarios will also include changed commodity movements by larger non-coal shippers that may find it necessary to change commodity flows based on changed modal availability/access.

⁴⁴ Should the sponsor choose, the study team may be able to provide rough estimates of revenue changes under alternative tax structures.

⁵ For example, see "What to Expect in 2030: The Impacts of Fuel Price and Fuel Economy on Land Use and Transportation," Erdogan, et al, Transportation Research Record, No. 2397, 2014, pp. 89-98.

