Motor fuel taxes have been collected as a principal source of the highway funding for close to a century. They account for approximately two third of all the highway user fees and about half of all highway expenditures. Federal fuel taxes have not kept a pace with the inflation in general and increasing traffic demand and resulting construction, maintenance and operation costs of the transportation assets in particular. Lack of political will, combined with raising anti-tax sentiment among the populace, has kept the federal tax level not only well below its initial intents, but also at a sustainable level in future.

Mileage based user fees are possibly an alternative to the fuel taxes, that have been the main mechanism for funding the transportation system. Mileage based user fee has been successfully utilized in many parts of the world with glowing results. Germany has utilized GPS technology in collecting the users’ fee from the truck operators. The system has been a financial engine providing much needed funding for many major transportation projects. Oregon Department of Transportation, in a federally co-funded pilot project examined the practicality of the mileage based user fee collection at the fuel pumps. According to the Oregon study, there are not any major technical difficulties in mileage based user fee collection at the pump. Study participants (general motorist) did not express any objection to the mileage based user fee collection.

This dissertation evaluates revenue impacts of several pricing policies including: Current per gallon fuel taxes, conversion to a mileage based user fee, time of day user fee application, area type user fee and congestion priced user fees. State of Florida’s years 2015-2035 fuel revenue forecast is used as a case study. A uni-variant aggregated time series model is constructed to estimate annual vehicle miles travelled for the analyses period. The forecasted annual vehicle miles travelled have been validated against population, employment and economical trends and outlooks.

A robust, scalable and adaptive financial model has been developed to assess the revenue impacts of various fuel taxes/fee collection strategies. Fuel efficiencies, current per gallon fuel taxes and their corresponding mileage-based user fee equivalents, price elasticity, trip diversions, traffic characteristics, fleet composition are some of the critical input to a financial model.

Results demonstrate that decrease in fuel revenues due to vehicles fuel efficiency improvements and increased cost of collection and administration can be offset by replacing current per gallon fuel taxes with a mileage-based user fee. Pricing the user fee according to area type, roadway classification, time of the day and congestion level can not only generate more revenues but also assist in demand management.

Major: Civil Engineering

Educational Career:
Bachelor's of Civil Engineering, BS, 1980, Bluefield State College
Master's of Civil Engineering, MS, 1985, Virginia Tech University

Committee in Charge:
Haitham Al-Deek, Chair, CECS
Ahmed Essam Radwan, CECS
Mohammed A. Aty, CRCS
Nizzam Uddin, STAT

Approved for distribution by Haitham Al-Deek, Committee Chair, on May 30, 2012.
The public is welcome to attend.