

## **A Comparison Analysis of Methods Used to Estimate GHG Emissions to Better Understand the Effects of Transportation Investments**

**AUTHOR:** Judith Mwakalonge, Prairie View A&M University, Prairie View, TX, USA

**SECONDARY AUTHOR:** Juhann Waller, North Carolina A&T State University, Greensboro, NC, USA  
Judy Perkins, Prairie View A&M University, Prairie View, TX, USA

Transportation provides means of moving people and goods which drives the local and global economies of the society. Despite its importance, the transportation sector in the United States accounts for over 8% of the global, and 33% of the national carbon dioxide (CO<sub>2</sub>) emissions which is rising at a higher rate (1.8% annually) than any other economic sector. Within the transportation sector, cars and trucks account for a majority of CO<sub>2</sub> and other green house gas (GHG) emissions which contribute to global warming. Air quality or the environment is one of the eight factors stipulated in the federal statute that require Metropolitan Planning Organizations (MPOs) and State Departments of Transportation (DOTs) to consider in the transportation planning process. However, the integration of climate change into long-range transportation plans is a new development and there is a potential need for incorporating the quantity of GHG emissions into transportation planning in the near future.

To effectively quantify the contribution of different transportation investments in GHG emissions, transportation agencies need to incorporate and evaluate GHG emissions in the planning process. Additionally, the agencies need to effectively quantify the current and forecast the future GHG emissions levels and the potential impacts of various policies and strategies on reducing emissions to acceptable level.

The main objective of this study is to compare the performance of the different CO<sub>2</sub> emissions models in replicating observed or actual CO<sub>2</sub> emissions. Further the study formulates and compares performance of models formulated and estimated with regional data to those estimated with national data. The results show that, all else being equal, increasing travel time by one minute increases total kilograms of CO<sub>2</sub> by more than 6.88%. This implies that, transportation programs and land use policies that reduces regional travel time have significant impact on reducing CO<sub>2</sub> emissions.