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Consistent VMT Mapping and Modeling in California: How Can We Better Assess the VMT Impacts of State and Local Transportation Projects?

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Introduction

Despite California's ambitious target to achieve carbon neutrality by 2045, the state is not reducing greenhouse gas (GHG) emissions from personal vehicle travel, and per capita Vehicle Miles Traveled (VMT) and GHG emissions continue to increase. One central challenge of climate planning facing California is the lack of consistent methods to measure the VMT impacts of transportation projects. VMT is an essential metric used by agencies and researchers to understand travel and related factors. This research aims to answer the question: "What are the advantages and limitations of existing VMT calculators to determine the climate impacts of transportation projects to help meet California's climate goals?"

Study Methods

This study divides the evaluation of VMT impacts into two main steps:

The first step is the qualitative analysis of the advantages and limitations of the existing VMT mapping and modeling tools. This part of the study, which looks at how VMT is currently measured and being used, includes a review of the current tools in practice to identify potential best practices and innovative approaches. It also includes interviews with 24 transportation professionals in California to learn about the technical and practical advantages and limitations of existing VMT tools and metrics from their standpoint.

In the second step, the VMT mapping and modeling tools are analyzed quantitatively. The primary aim of this analysis is to provide practical insights into how different VMT assessment tools and methods can impact decision-making about transportation projects. This includes project selection, prioritization, and mitigation recommendations. By establishing a cluster of tools and a common application scenario, we can understand the advantages and limitations of one tool over another, the types of data used as inputs, and the sensitivity and usability of these tools. For example, some tools, such as induced travel calculators, are based on research and data-driven models, while other tools, such as the WRCOG VMT tool, use a spreadsheet model built from a travel demand model. Clustered data is helpful for planners, engineers, or policymakers in choosing the appropriate tool for their projects.

Lastly, the report explores applications of these tools by developing appropriate hypothetical scenarios for each tool and analyzing the results.

Findings

Findings indicate that the consistency of the VMT tools varies significantly based on their design and methodology. For example, using fixed elasticity values and conservative estimates in the NCST tool can lead to inconsistencies among scenarios developed in different geographical locations. On the other hand, a spreadsheet-based tool, WRCOG, relies on generalized criteria that result in consistent output when applied to that specific scenario. The OPR Site Check Map and VMT+ provide baseline and comparative insights, leading to consistent results within their limited scopes but cannot dynamically adapt to evolving scenarios. In contrast, VisionEval, with its detailed scenario planning capabilities, offers a high degree of consistency in exploring various futures, making it robust for policy impact analysis despite its complexity.

Users of VMT tools should select the most appropriate tool for their specific needs and context. Interviewees often stressed that context sensitivity is vital for accurate VMT analysis; therefore, one-size-fits-all tools may not be appropriate for every region. For example, the NCST Induced Travel Calculator is particularly suited for the initial planning stages

of capacity expansion projects on major arterials. The OPR Site Check Map is beneficial for preliminary site assessments across a variety of development projects. VMT+ excels in providing detailed VMT insights at granular geographic levels and is useful for comparative regional analysis, and VisionEval is designed for comprehensive scenario planning.

The data used and the model complexity of each tool impact the accuracy and relevance of the results, and the usability and depth of analysis. For example, the NCST Induced Travel Calculator and WRCOG VMT Tool are relatively straightforward and user-friendly, making them suitable for initial assessments. The OPR Site Check Map and VMT+ are also user-friendly but provide limited depth in their analysis. In contrast, VisionEval is the most complex of the tools, requiring significant training and extensive data inputs. However, this complexity allows VisionEval to offer detailed scenario planning and comprehensive analysis capabilities.

California should create context-sensitive VMT tools and encourage the use of an integrated approach to VMT analysis.

Policy Recommendations

Recommendations for the state include to: (1) improve access to accurate, validated data for creating and inputting into VMT models and tools; (2) help create context sensitive VMT tools capable of capturing local context and change over time; (3) strengthen dialogue between jurisdictions to share information and tools; and (4) encourage use of an integrated approach to VMT analysis—which often combines use of different tools and datasets for various stages of decision-making and scenario planning. This research can help significantly enhance the tools and methodologies used for VMT assessment, leading to better-informed transportation planning and policy decisions in California.

About the Authors

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To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/2314

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