Oregon Department of Transportation

Research Stage 1 Problem Statement

Number 26-58 – "Reevaluation of VMT Based on Changes in Travel Behavior to Improve VMT Forecasts"

1. Concisely describe the **transportation issue** (including problems, improvements, or untested solutions) that Oregon needs to research.

Since the notable drop in VMT during the pandemic, VMT in Oregon has fluctuated, in large part due to post-pandemic travel behavior changes. VMT fluctuations are also observed at disaggregate levels. For example, statewide VMT increased in the most recent year, yet several counties had a decrease and some municipalities had a decrease. This is also evident in municipalities where certain roadway classifications experienced a decrease, while other roadway classifications experienced the opposite. Due to these fluctuations and changes in travel behavior, understanding and forecasting VMT trends in a post-pandemic world can be challenging. As a result, there is a need to understand the factors affecting changes in VMT in Oregon and to use this knowledge to accurately forecast VMT. The need to accurately forecast VMT, at various levels within Oregon, is pertinent to monitoring Oregon's climate goals, planning efforts, and other goals as stated in the Oregon Transportation Plan.

2. What **final product or information** needs to be produced to enable this research to be implemented?

The final product of this research aims to provide a comprehensive report to ODOT on VMT changes, changes in travel behavior, and VMT forecasts. The report will include results from a comprehensive analysis on VMT in Oregon. This research will focus on VMT at various levels, including statewide, MPO, TAZ, county, and other disaggregated levels (roadway classifications, urban vs. rural, and others). By including information from household surveys (local and national), census data, and historical traffic data, this research will develop a suite of VMT forecasting tools representing post-pandemic travel behavior that can be used in Oregon's Transportation Plan, climate efforts, and transportation equity efforts.

In addition to different disaggregation levels, the report and analysis will consider VMT trends and VMT forecasting by transportation mode, with a particular focus on passenger vehicles and freight vehicles, where freight vehicles are a major contributor to carbon emissions. For freight VMT, freight data related to commodities, business type, and other factors will be considered. The research team will utilize already obtained third-party data, in addition to publicly available data, to supplement the freight VMT analysis and forecasting methods. Through the analysis, key recommendations may address:

- **Fluctuations in VMT**: Identify factors related to changes in travel behavior and freight behavior in a post-pandemic world to include in VMT forecasting methods at varying levels of disaggregation. Summarize the changes in travel behavior and provide supporting evidence for such changes. Provide recommendations and strategies to ODOT on how to incorporate these changes in analysis methods and planning procedures.
- **Climate Impacts**: Identify long-term climate impacts based on VMT forecasting. Identify those areas in which VMT is expected to continue to increase and determine what the potential impacts are on Oregon's climate goals. Provide estimations of carbon emissions based on VMT forecasting

results and recommend strategies that ODOT can implement to address trends that are counterproductive to Oregon's climate goals.

- **Equity Impacts**: Identify locations in which VMT is increasing, and expected to increase, where additional carbon emissions would disproportionately impact communities. Provide recommendations based on forecasts, and understanding of the changes in travel behavior, that can be used to mitigate the impacts of carbon emissions in these communities.
- **VMT Forecasting**: Present ODOT with a framework to forecast VMT at various levels while considering the changes in travel behavior post-pandemic.

3. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

4. Decision making lenses

Please complete the following three sections. Your answers to these questions will be applied on a programmatic basis to support agency decisions. Answering yes to the questions below is not required. Resolving a narrowly focused technical research problem may meet agency needs without answering yes to any of the following questions. The ODOT Research Section will seek a balanced portfolio some projects will answer yes to one of the three categories below (e.g. climate, equity, and/ or safety) and other projects in a different category.

We are looking for an overall program balance and no one project is expected to balance all categories. Generally, a research problem statement is expected to be able to answer yes with clear and verifiable information in only one of the three categories below, some projects may be able to answer yes in two or even three categories. Some projects (i.e. needs focused on specific elements of infrastructure design), may have no yes answers but may still be high value research need.

Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. Every mile driven in Oregon is powered by a clean source of fuel. We seek research that supports construction and maintenance operations are carbon neutral and investments in mobility that support travel by low and no emission modes. While every research project may not result in a reduction in emissions, transportation investments overall support emission reductions to achieve state goals. Oregon envisions a transportation system that is resilient in the face of seismic and climate events and impacts to the degradation of the natural environment are reduced. Our vision includes a transportation infrastructure is built in a way that avoids impacts on key habitat and results in better environmental conditions for wildlife and native vegetation. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

4f. Will addressing the **transportation issue** identified as a need in Question 1 develop, or validate methods for the estimation, measurement, or monitoring of transportation generated greenhouse gasses (GHG)?

☒Yes ☐No ☐Unsure

4g. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

☒Yes ☐No ☐Unsure

4h. Will the addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

☐Yes ☒No ☐Unsure

4i. Will the solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

☒Yes ☐No ☐Unsure

4j. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☐Yes ☐No ☒Unsure

4k. Will the solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation ?

☒Yes ☐No ☐Unsure

4l. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

In the transportation sector, VMT plays a critical role in carbon emissions. Post-pandemic, VMT has fluctuated due to changes in travel behavior, which makes understanding VMT factors, and therefore forecasting VMT, challenging. This research intends to address these issues, resulting in factors that represent the changes in travel behavior and a suite of VMT forecasting methods that can be used to assess VMT changes in Oregon. Accurately forecasting VMT while considering post-pandemic travel changes will directly impact the ability to monitor Oregon's climate efforts and support the reduction of VMT and resulting carbon emissions. Areas that are forecast to have increased VMT can be targeted for carbon emission mitigation strategies. Lastly, by also looking at transportation mode (e.g., passenger vehicles, freight vehicles) and urban vs. rural scenarios, Oregon can better estimate future carbon emissions and strategically target transportation sectors as it pertains to VMT and carbon emissions.

Equity

Equity can have many dimensions and impacts relating to communities, and transportation. It is important that problem statement proposals clearly explain in what capacities are equity dimensions or impacts being examined within problem statements. It is a goal of the OTP to "Improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust". Proposed research may have the intent of studying elements of this goal or apply analysis to specific transportation topics to ensure the

resulting research recommendations is consistent with our equity goals. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

4a Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☐Yes ☒No ☐Unsure

4b If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

☒Yes ☐No ☐Unsure

4c Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

☐Yes ☐No ☒Unsure

4d Is the intended final product or information expected to support ODOT's equity efforts (Including but not limited to supporting one of the equity related objectives of the ODOT's Strategic Action Plan or Oregon Transportation Plan) ?

☒Yes ☐No ☐Unsure

4e If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

This research directly relates to climate equity outlined in Oregon's Strategic Action plan. By identifying and accounting for travel behavior changes in Oregon, this research will provide VMT forecasts that account for these changes. In doing so, this research will be able to pinpoint regions, municipalities, and communities that are expected to experience continued increases in VMT and, therefore, increased carbon emissions. This is particularly true for those communities that are expected to experience larger increases in freight traffic, where freight is a primary contributor to carbon emissions within the highway transportation sector. This research will offer recommendations on strategies to reduce VMT in such communities, which may include guidance on modal shifts, guidance on electronic vehicle adoption, or guidance on strategies that can be related to the public to help in these matters.

Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan, Oregon Transportation Safety Action Plan and Oregon Transportation Plan.

4m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☐Yes ☐No ☒Unsure

4n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☒Yes ☐No ☐Unsure

4o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☐Yes ☒No ☐Unsure

4p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☐Yes ☒No ☐Unsure

4q. Will the solving the **transportation issue** support improving safety through **investing strategically**?

☐Yes ☒No ☐Unsure

4r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

Although this research is not focused on safety, there is an inherent link between exposure and safety. Better understanding post-pandemic travel behavior and VMT trends, which leads to more informed VMT forecasting methods, can assist in safety analysis from an exposure lens. Additionally, in areas where VMT is expected to increase, ODOT can consider recommendations made through this research to lower VMT, which in turn improves safety due to reduced exposure.

5. Other comments:

Due to substantial changes in travel behavior and transportation trends during- and post-pandemic, studies have indicated a potential need to update transportation processes (Polzin, 2021). Included in the recommendations are acquiring new data to account for post-pandemic travel behavior and trends, developing calibration factors for forecasting methods or develop new forecasting methods/models that account for these changes, account for fluctuating travel to assist agencies in planning and designing for increased or decreased demand, and explore additional performance metrics for various factors, including energy/emissions. These recommendations further extend to transportation equity and transportation safety. In light of this, there have been some studies aimed at understanding post-pandemic travel trends (Handy et al., 2023; Ozbilen et al., 2024). These studies, however, focus on general trends and the general impact of the pandemic on specific travel trends. The Federal Highway Administration has applied and made available post-pandemic VMT forecasting models, yet the final models focus solely on economic factors and do not account for individual-level changes in travel behavior. Additionally, it is unclear how these holistic models apply to location-specific scenarios and behavior.

A brief descriptive analysis of the National Household Survey indicates changes in key trip trends in the Pacific Region, including trip purpose, trip distance, trip mode, trip duration, vehicle type, and others. Individual trends also indicate key changes, including various impacts on the pandemic on travel and shopping behavior, where statistics show that some of these behaviors have continued beyond the pandemic. Despite more disaggregate travel behavior and trends, these region-specific trends highlight a

significant change in travel behavior. As such, there is a need to understand this behavior and incorporate these changes into understanding current VMT trends and VMT forecasting methods.

In summary, this research is design to provide ODOT with a comprehensive understanding of post-pandemic travel behavior changes and how it is impacting VMT. Through the analysis, this research will also provide a framework that incorporates these behavioral changes into VMT forecasting methods, which will directly impact Oregon's climate efforts and goals in the Oregon Transportation Plan. This will also present an opportunity to serve as a blueprint for accounting for post-pandemic travel behavior and trends in the VMT forecasting process.

References:

Handy, S., Gradjura, S., Sun, R., Barbour, E., Barajas, J. M., Jaller, M., … Circella, G. (2023). *Post-Covid Transportation Scenarios: Evaluating the Impact of Policies*. Sacramento, CA. The California Air Resources Board and California Environmental Protection Agency. Contract No. 20STC008.

Ozbilen, B., Gulhare, S., Makino, K., Jena, A., Iogansen, X., Loa, P., … Circella, G. (2024). *Barriers to Reducing the Carbon Footprint of Transportation Part 2: Investigating Evolving Travel Behaviors in the Post-Pandemic Period in California*. Sacramento, CA. California Air Resources Board, The University of California Institute of Transportation Studies, and U.S. Department of Transportation. Report No. UCD-ITS-RR-24-25.

Polzin, S. E. (2021). Post-COVID-19 Transportation Trends. *ITE Journal*, *94*(4), 37–44.

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