

# SPR RESEARCH PROGRAM

## SECOND-STAGE PROPOSAL SUMMARY

### PROBLEM NUMBER AND TITLE

**26-44 – Development of Methods to Produce High-Quality ‘Household-Based’ VMT Dataset**

### PROBLEM SUMMARY

Household-based Vehicle Miles Traveled (VMT) is essential for ODOT’s safety, climate, equity, and planning initiatives. Traditionally, ODOT has reported on-road VMT to FHWA by monitoring traffic on public roads, but new state planning requirements now emphasize household-based, light vehicle VMT—tracking passenger vehicle travel by Oregon residents, regardless of location. This measure supports metropolitan greenhouse gas (GHG) reduction targets (OAR 660-044, 660-012) by reflecting the impact of local climate actions on resident-generated VMT. Accurate household-based VMT data is critical as ODOT implements new local and metropolitan GHG reporting requirements, tracks VMT per capita as a Key Performance Target in the 2022 Oregon Transportation Plan, and reports electric-vehicle VMT to the legislature. Without this research, the agency lacks an empirical method for measuring household-based VMT.

### ODOT OBJECTIVES

The research will establish a framework for developing a high-quality household-based VMT measurements by integrating available empirical data and evaluating each dataset’s strengths and weaknesses for monitoring household-based. This research will leverage **Oregon’s 2023-2024 household travel survey**, which collected **1- to 7-day travel diaries from 22,000 households**—a rare opportunity, as such surveys occur only about every 13 years. Additional VMT data sources include **DMV and DEQ odometer readings**, which require evaluation for completeness, privacy, and accuracy; **ODOT’s OreGO program**, which provides high-quality VMT data but has limited participation and self-selection bias; and **third-party data vendors**, which have been used by other state DOTs but remain untested for accuracy in Oregon. This research will assess the strengths and limitations of these data sources and develop a methodology for integrating **reliable household-based VMT data**. If critical flaws are identified, it will provide recommendations to improve **VMT measurement** through future data collection and administrative processes.

### BENEFITS

Application of a reliable household-based VMT performance measures will allow ODOT and its partner agencies to determine if efforts to reduce per capita VMT from light duty vehicles are successful. Through program implement and infrastructure investment at the state and local level, agencies are improving the safety and accessibility of pedestrian, transit, and bicycle networks that past research has shown can eliminate the need for vehicle trips and reduce overall VMT. The proposed research would allow for more detailed monitoring of the effects of these interventions so that agencies can learn what projects and programs are working and what needs to be revisited in order to meet the states climate goals.

### SCHEDULE, BUDGET AND AGENCY SUPPORT

**Estimated Project Length:** 24 months.

**Estimated Project Budget:** \$145,000

**ODOT Support:** Zachary Horowitz, PE— Senior Transportation Analysis Engineer; Tara Weidner – Climate Impact Analysis Program Lead; Jared Roskelley – OreGo Program Data Analyst

### FOR MORE INFORMATION

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at:

<https://www.oregon.gov/odot/Programs/ResearchDocuments/26-44>

# SPR RESEARCH PROGRAM

## SECOND-STAGE PROBLEM STATEMENT

### FY 2025

#### PROBLEM NUMBER AND TITLE

**26-44 – Development of Methods to Produce High-Quality ‘Household-Based’ VMT Dataset**

#### RESEARCH PROBLEM STATEMENT

Vehicle Miles Traveled (VMT) is a fundamental dataset for the Oregon Department of Transportation, supporting safety, climate, equity, and various statewide planning initiatives. While the agency has long collected and reported on-road VMT to the Federal Highway Administration (FHWA) by monitoring traffic on public roads, there is now a growing need to analyze VMT generated specifically by households within Oregon.

Recently, new state planning requirements focused on VMT that is generated by “household-based, light vehicles” residing in Oregon. This new VMT definition focuses on the travel by residents (passenger vehicles only) of a region, regardless of where the travel occurs. This definition is used to track Oregon’s metropolitan greenhouse gas (GHG) reduction targets (OAR 660-044, 660-012), as it better represents the influence of climate actions by local agencies on VMT generated by residents.

The need for this household-based VMT<sup>1</sup> data is vital; as ODOT sets up new local and metropolitan GHG reporting requirements, is called to track VMT per capita reductions as a Key Performance Target in the 2022 Oregon Transportation Plan and is asked to report electric-vehicle VMT to the legislature. Without this research the agency does not have a method for properly monitoring household-based VMT.

#### RESEARCH OBJECTIVES

The research will establish a framework for developing a high-quality household-based VMT dataset by integrating available empirical data, evaluating each dataset’s strengths and weaknesses for monitoring household-based VMT. Data sources available to this research include:

- VMT measured for households participating in Oregon Travel Survey which included 22,000 Oregon households
- Odometer readings from vehicle inspections performed by Department of Environmental Quality (DMV and DEQ)
- VMT measures from vehicles involved in the OReGO program
- Third-party data (big data) from transportation data companies

The agency and this research will benefit from the recently conducted (2023-2024) household travel survey which collected one to seven day travel diaries from 22,000 household across the state. Having recent survey data is a great opportunity, given that these collection efforts historically only occur every 13 years in Oregon. Odometer readings from DMV and DEQ are another source of VMT data available that have great potential but questions about data completeness and accuracy remain. Data from ODOT’s OreGO offers the promise of high quality VMT data but the number of users is low and subject to self-selection bias so need to

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<sup>1</sup> 1 OAR 660-012-0005(64) definition “Vehicle Miles Traveled (VMT) means all jurisdiction household-based light vehicle travel regardless of where the travel occurs.”

be evaluated. And lastly, data from third party data vendors have been utilized by other state DOTs for the purpose of monitoring household-based VMT but this source has never been evaluated to assess its accuracy or completeness.

This research will deliver an evaluation of available data sources and a methodology for integrating reliable data to monitor household-based VMT. If all available datasets are found to have critical flaws, the research will recommend steps for the agency to improve VMT measurement through existing and future data collection and administrative processes.

## **WORK TASKS, COST ESTIMATE AND DURATION**

The following describes the proposed work tasks for this project and associated costs:

### **Task 1 – Literature Review (\$10,000)**

This task would search for and review available gray and academic literature relevant to this research including methods and factors relative to household VMT generation, policies and programs for reducing household VMT, and evaluations of third-party data products.

### **Task 2 – Data Evaluation (\$65,000)**

The work in this task would seek to evaluate the data quality of various datasets available to this research, documenting the strengths and weaknesses of each and evaluating one or more third-party data products. Access to third-party data products for evaluation purposes will likely incur a cost which is also reflected in the funding need of this task.

### **Task 3 – Data Integration and Method Development (\$55,000)**

Once the strengths and deficiencies of existing data are understood and documented, this research would determine feasibility with integrating available data sources with other data about the transportation and land use system. These integrated data would then be used in statistical and machine learning models that if found to be reliable, could be used as a monitoring method for ongoing observations of household-based VMT.

### **Task 4 – Final Draft Report and Method Deliverable (\$15,000)**

The final task proposed in this work would document the data evaluation, integration, and methods development into a final report as per ODOT Research standards. Additionally, the research team would create final data, methods and model objects available for use in an application monitoring tool.

### ***Key Deliverables:***

- 1. Integrated and evaluated household-based VMT data from available sources.*
- 2. Method for monitoring household-based VMT and/or recommendations for collecting necessary data through ongoing administrative processes.*

***Estimated Project Length:*** 24 months.

***Estimated Project Budget:*** \$145,000

## IMPLEMENTATION

The findings from this research will ideally lead to a monitoring tool that ODOT's Climate Office, supported by the Transportation Planning and Analysis Unit will utilize to track progress on the household-based VMT and states climate goals. If the data available for this research are found to be insufficient for the purposes of monitoring, recommendations for data collection through existing administrative processes will be documented.

## POTENTIAL BENEFITS

Application of a reliable household-based VMT performance measure will allow ODOT and its partner agencies to determine if efforts to reduce per capita VMT from light-duty vehicles are successful. Through program implementation and infrastructure investment at the state and local level, agencies are improving the safety and accessibility of pedestrian, transit, and bicycle networks that past research has shown can eliminate the need for vehicle trips and reduce overall VMT<sup>2</sup>.

The proposed research would allow for more detailed monitoring of the effects of these interventions so that agencies can learn what projects and programs are working and what needs to be revisited in order to meet the state's climate goals. Additionally, integrating multiple data sources into a comprehensive household-based VMT measure will improve the accuracy and consistency of VMT tracking across different regions and demographic groups. This research will also support fairer policy development by helping agencies understand how VMT reduction strategies impact various populations, ensuring that benefits and burdens are distributed fairly. Ultimately, a robust monitoring framework will enable data-driven decision-making, allowing ODOT to refine strategies and maximize the effectiveness of its investments in sustainable transportation.

## PEOPLE

### **ODOT champion(s):**

Zachary Horowitz, PE – Senior Transportation Analysis Engineer

Tara Weidner, PE – Climate Impact Analysis Program Lead

Jared Roskelley – OreGo Program Data Analyst

### **Problem Statement Contributors:**

- Alex Bettinardi, PE – Senior Integrated Analysis Engineer Oregon DOT - alexander.o.bettinardi@odot.oregon.gov
- Tara Weidner, PE – Climate Impact Program Lead – Oregon DOT - [tara.j.weidner@odot.oregon.gov](mailto:tara.j.weidner@odot.oregon.gov)
- Jared Roskelley – OreGo Program Data Analyst – OregonDOT - jared.roskelley@odot.oregon.gov
- Josh Roll – ODOT Research Services Unit – josh.f.roll@odot.oregon.gov

## REFERENCES

Byars, M., Wei, Y., & Handy, S. (2017). *State-level strategies for reducing vehicle miles of travel: A research report from the University of California Institute of Transportation Studies*. Institute of Transportation Studies, UC Davis.

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<sup>2</sup> Handy et al. 2017. *State-Level Strategies for Reducing Vehicle Miles of Travel*  
[https://d3n8a8pro7vhmx.cloudfront.net/climateplan/pages/44/attachments/original/1509403808/2017-PTA-Handy\\_UCDavis\\_VMT\\_Report\\_1.pdf](https://d3n8a8pro7vhmx.cloudfront.net/climateplan/pages/44/attachments/original/1509403808/2017-PTA-Handy_UCDavis_VMT_Report_1.pdf)

# STAFF REVIEW PAGE

## LITERATURE CHECK

### TRID&RIP

☒ A review of TRID & RIP databases found no existing research that answers the research question

## ODOT DECISION LENSES

**Climate:** This project would develop data and analysis capabilities to support the Climate Office and their ongoing implementation of the Statewide Strategy so this project supports the agencies goals of addressing climate.

**Equity:** This research does not directly address equity and disproportionate impacts to communities of concern though through the analysis would explore the differences in household VMT generation by household characteristics such as income.

**Safety:** This project does not directly address safety.

## TECHNOLOGY & DATA ASSESSMENT

☐ No Identified T&D output

☒ At the end of this project, the implementing unit(s) within ODOT will need to coordinate the adoption of new technology or data in order to realize the full potential of this research.

This research project would develop data and analytic capability for monitoring household VMT generation and would require maintenance of data and analysis platform to be successfully used for monitoring over time.

## CROSS-AGENCY IMPACTS

- List ODOT partners or impacted units.
  - Climate Office
  - Transportation Planning and Analysis Unit
- Identify any issues of concern raised by an ODOT partners. Note expected mitigation that addresses these concerns
  - This project would explore available data and analysis procedures and there is high probability of success but the project has risk in that the data possesses significant bias and is unable to be used for the intended purposes. One of the researches stated goals is to determine the usability of available data so the risk is inherent to the project