ITE Transportation Capacity and Mobility Task Force - SB 743 Modeling Subcommittee

Refined VMT/Employee Metric for SB 743 Analysis

Final: 9/10/2021

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This document describes the VMT/Employee metric, the current components of the metric, and refinements that will be made to the metric.

What is VMT/Employee?

VMT/Employee is used as a metric to evaluate VMT transportation impacts for employment projects. The metric is an "efficiency" metric that sums employee VMT and divides by the total number of employees. As with any VMT metric, the specific VMT that is included in the numerator of the calculation varies across agencies and travel models. This is due to variations in modeling procedures, model output, model type, and interpretation of what types of VMT should be included in the calculation.

The Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (December 2018) provides general guidance related to the VMT/employee metric and calculation methods. The following excerpts are from the OPR Technical Advisory related to calculating VMT/Employee:

Page 16:

> **Recommended threshold for office projects:** A proposed project exceeding a level of 15 percent below existing regional VMT per employee may indicate a significant transportation impact.
>
> Office projects that would generate vehicle travel exceeding 15 percent below existing VMT per employee for the region may indicate a significant transportation impact. In cases where the region is substantially larger than the geography over which most workers would be expected to live, it might be appropriate to refer to a smaller geography, such as the county, that includes the area over which nearly all workers would be expected to live.
>
> Office VMT screening maps can be developed using tour-based data, considering either total employee VMT or employee work tour VMT. Similarly, tour-based analysis of office project VMT could consider either total employee VMT or employee work tour VMT. Where tour-based information is unavailable for threshold determination, project assessment, or assessment of mitigation, home-based work trip VMT should be used throughout all steps of the analysis to maintain an "apples-to-apples" comparison.

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Background on Estimating Vehicle Miles Traveled

Before discussing specific methodological recommendations, this section provides a brief overview of modeling and counting VMT, including some key terminology.

Here is an illustrative example of some methods of estimating vehicle miles traveled. Consider the following hypothetical travel day (all by automobile):

1. Residence to Coffee Shop
2. Coffee Shop to Work
3. Work to Sandwich Shop
4. Sandwich Shop to Work
5. Work to Residence
6. Residence to Store
7. Store to Residence

Trip-based assessment of a project's effect on travel behavior counts VMT from individual trips to and from the project. It is the most basic, and traditionally the most common, method of counting VMT. A trip-based VMT assessment of the residence in the above example would consider segments 1, 5, 6 and 7. For residential projects, the sum of home-based trips is called *home-based* VMT.

A *tour-based* assessment counts the entire home-back-to-home tour that includes the project. A tour-based VMT assessment of the residence in the above example would consider segments 1, 2, 3, 4, and 5 in one tour, and 6 and 7 in a second tour. A tour-based assessment of the workplace would include segments 1, 2, 3, 4, and 5. Together, all tours comprise *household* VMT.

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Characteristics of an office project can also affect an employee's VMT beyond the work tour. For example, a workplace located at the urban periphery, far from transit, can require an employee to own a car, which in turn affects the entirety of an employee's travel behavior and VMT. For this reason, when estimating the effect of an office development on VMT, it may be appropriate to consider total employee VMT if data and tools, such as tour-based models, are available. This is consistent with CEQA's requirement to evaluate both direct and *indirect* effects of a project. (See CEQA Guidelines, § 15064, subd. (d)(2).)

The OPR Technical Advisory provides suggestions on what aspects of an employee's VMT can be considered when performing a VMT/employee analysis.

For San Diego region purposes, the VMT/Employee uses "tour-based" VMT because the SANDAG Regional Travel Demand Model is an activity based (or tour based) model. For a tour-based model, OPR suggests that the analysis can consider work tour VMT, which would include any leg of a trip that is associated with someone going from home to work (and back home) or any leg of a trip of someone going from work to another location (and back to work). The OPR Technical Advisory also offers an option to use "total" employee VMT; however, doesn't specifically define what is included in an employee's "total" VMT.

What does the SANDAG Model VMT/Employee metrics produced for ABM 1 and ABM 2 include?

SANDAG produces VMT/employee as a standard metric that is provided for VMT analysis. The VMT/employee metric definition for Activity Based Model 1 (ABM 1) and Activity Based Model 2 (ABM 2) is:

VMT/Employee: All automobile vehicle-trips and associated VMT made by employed persons who live and work in the SANDAG Region are traced back to the workplace of the trip-maker, even trips that are not work related. The VMT/employee metric has the following characteristics/limitations:

- Includes all VMT, work and non-work related. This presents challenges when applying commute specific travel demand management measures because the measures only apply to work related trips. The current methodology does not provide a method for determining how to calculate the work-related portion of the VMT/employee metric.
- Only includes employees who are also residents of the SANDAG Region.
- Only includes VMT that occurs within the SANDAG region. If an employee resident leaves the region and then returns, their "external" VMT is not included.

***Work Tour* VMT/Employee Metric for Future Model Versions**

Given the limitations with the ABM 1 and ABM 2 VMT/employee metrics, the San Diego ITE Task Force Model Sub-Committee has recommended (and SANDAG has agreed) to refining the ABM 1 and ABM 2 VMT/employee metric for future model versions starting with ABM 2+. The refined metric provides more detailed estimates that are consistent with the recommendations from the OPR Technical Advisory and make applying commute related travel demand management VMT reduction more straightforward. Specifically, the refined metric, ***work tour VMT/employee***, is responsive to the following quotes from the OPR Technical Advisory:

- *Considerations for All Projects. Lead agencies should not truncate any VMT analysis because of jurisdictional or other boundaries, for example, by failing to count the portion of a trip that falls outside the jurisdiction or by discounting the VMT from a trip that crosses a jurisdictional boundary. CEQA requires environmental analyses to reflect a "good faith effort at full disclosure." (CEQA Guidelines, §15151.) Thus, where methodologies exist that can estimate the full extent of vehicle travel from a project, the lead agency should apply them to do so. Where those VMT effects will grow over time, analyses should consider both a project's short-term and long-term effects on VMT (Page 6).*

- *When tour-based models are used to analyze an office project, either employee work tour VMT or VMT from all employee tours may be attributed to the project. This is because workplace location influences overall travel. For consistency, the significance threshold should be based on the same metric: either employee work tour VMT or VMT from all employee tours (Page 5).*

- *Here is an illustrative example of some methods of estimating vehicle miles traveled. Consider the following hypothetical travel day (all by automobile):*

    - *1. Residence to Coffee Shop*

    - *2. Coffee Shop to Work*

- *3. Work to Sandwich Shop*
- *4. Sandwich Shop to Work*
- *5. Work to Residence*
- *6. Residence to Store*
- *7. Store to Residence*

… A tour-based assessment counts the entire home-back-to-home tour that includes the project. A tour based VMT assessment of the residence in the above example would consider segments 1, 2, 3, 4, and 5 in one tour, and 6 and 7 in a second tour. ***A tour-based assessment of the workplace would include segments 1, 2, 3, 4, and 5.*** *Together, all tours comprise household VMT (Page 29).*

The definition of the refined work tour VMT/employee is:

Work Tour VMT/Employee: All work tour automobile vehicle-trips and associated VMT made by employed persons who work in the SANDAG Region are traced back to the workplace of the trip-maker. *The change to work tour VMT is to respond to the OPR Technical Advisory from Pages 5 to 29 and to make the metric more specific to the actual land use. For a given employment land use location, an employer typically can only influence travel that is related to the work tour, the employer cannot influence a person's travel from their home to another non-work location.* The refined work tour VMT/employee metric has the following characteristics/limitations:

- Only includes an employee's workplace related travel, assigned to their place of employment.
- Only includes employees whose work location is not equal to their home location. For example, a self-employed business owner who operates out of their home would not be included as the metric is intended to analyze employment land use VMT.
- Includes employees who work within the SANDAG region, regardless of home location (for example, an employee who lives in Orange County is included).
- For non-resident employees, the calculation can only include the home to work commute trip length because a person's work tour is not available for non-residents. For example, a person who lives in Riverside County and commutes to San Diego County may have stops that they make on their work-tour that occur within Riverside County (perhaps that stop to drop a child off at school or stop at a coffee shop near their home). The SANDAG model is focused only on the San Diego County region and does not have information about trip making that occurs outside of its model boundary (which is true of all travel demand models).