

T-15. Limit Residential Parking Supply



GHG Mitigation Potential



Up to 13.7% of GHG emissions from resident vehicles accessing the site

Co-Benefits (icon key on pg. 34)



Climate Resilience

Limiting residential parking supply could incentivize increased use of public transit and thus result in less traffic, potentially reducing congestion or delays on major roads during peak AM and PM traffic periods. When this reduction occurs during extreme weather events, it better allows emergency responders to access a hazard site. Evacuation plans and plans for transport to cooling/heating/clean air centers during power outages or unhealthy air quality events, however, would need to consider needs of households without access to private vehicles.

Health and Equity Considerations

Limiting parking supply can reduce the cost of housing development and, potentially, increase housing supply and decrease housing expenses. However, this may negatively impact residents that do not have a viable alternative to personal vehicle travel.

Measure Description

This measure will reduce the total parking supply available at a residential project or site. Limiting the amount of parking available creates scarcity and adds additional time and inconvenience to trips made by private auto, thus disincentivizing driving as a mode of travel. Reducing the convenience of driving results in a shift to other modes and decreased VMT and thus a reduction in GHG emissions. Evidence of the effects of reduced parking supply is strongest for residential developments.

Subsector

Parking or Road Pricing/Management

Locational Context

Urban, suburban

Scale of Application

Project/Site

Implementation Requirements

This measure is ineffective in locations where unrestricted street parking or other offsite parking is available nearby and has adequate capacity to accommodate project-related vehicle parking demand.

Cost Considerations

Reducing residential parking supply, especially in high density residential areas, can have high-cost savings if it reduces the need for additional investment in parking infrastructure. Some of these savings may be offset by investments in alternative transport solutions, which will need to be robust to ensure that residents can effectively travel to work and all other destinations without a car.

Expanded Mitigation Options

When limiting parking supply, a best practice is to do so at sites that are located near high quality alternative modes of travel (such as a rail station, frequent bus line, or in a higher density area with multiple walkable locations nearby). Limiting parking supply may also allow for more active uses on any given lot, which may support Measures T-1 and T-2 by allowing for higher density construction.





GHG Reduction Formula

$$A = -\frac{B - C}{B} \times D \times E \times F$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from resident vehicles accessing the site	0–13.7	%	calculated
User Inputs				
B	Residential parking demand	[]	parking spaces	user input
C	Project residential parking supply	[]	parking spaces	user input
D	Percentage of project VMT generated by residents	[]	%	user input
Constants, Assumptions, and Available Defaults				
E	Percent of household VMT that is commute based	37	%	Caltrans 2012
F	Percent reduction in commute mode share by driving among households in areas with scarce parking	37	%	Chatman 2013

Further explanation of key variables:

- (B) – The user can calculate the parking demand in the *ITE Parking Generation Manual* based on the project building square footage or number of du. For residential projects, this demand varies based on the size of each unit, and ranges from 1.0 spaces/unit for one-bedroom apartments to 2.6 spaces/unit for single-family homes with 3+ bedrooms.
- (D) – Available research on changes in parking supply focuses on residential land uses. Therefore, reductions are applied only to the share of VMT generated by residents of a project. For most residential projects, this will be 100 percent; however, for mixed-use projects, the user will need to provide project-specific data.
- (E) – The percent of household VMT that is commute-based varies from location to location; the statewide average is 37 percent (Caltrans 2012). If the user can provide a project-specific value based on their project type and area, they should replace the default in the GHG reduction formula.
- (F) – A study found that among households with limited off-street parking (<1 space per adult), there was a 37 percent decrease in auto mode share for commute trips. The method above pro-rates this reduction based on how much the project's parking supply is reduced from demand rates calculated in the *ITE Parking Generation Manual* (ITE 2019). In addition, this reduction is applied to commute trips only due to the limitations of the research.



GHG Calculation Caps or Maximums

Measure Maximum

(A_{max}) The percent reduction in GHG emissions is capped at 13.7 percent. This occurs for projects that have no onsite parking (C), 100 percent of VMT arising from residential land use (D), and 37 percent of all VMT arising from commute trips (E). This maximum scenario is presented in the below example quantification.

($C > B$) Parking supply is considered to be limited when demand (C) exceeds supply (B). If demand is equal to or less than supply, then implementation of this measure would not result in a GHG reduction.

Subsector Maximum

($\sum A_{max_{T-14 \text{ through } T-16}} \leq 35\%$) This measure is in the Parking or Road Pricing/Management subsector. This subcategory includes Measures T-14 through T-16. The VMT reduction from the combined implementation of all measures within this subsector is capped at 35 percent.

Example GHG Reduction Quantification

The user reduces VMT by reducing a project's parking supply. In this example, the parking demand per ITE is 100 parking spaces (B) and the project would not supply any parking spaces (C). The user would reduce GHG emissions from VMT by 13.7 percent.

$$A = -\frac{100 \text{ spaces} - 0 \text{ spaces}}{100 \text{ spaces}} \times 100\% \times 37\% \times 37\% = -13.7\%$$

Quantified Co-Benefits



Improved Local Air Quality

The percent reduction in GHG emissions (A) would be the same as the percent reduction in NO_x , CO, NO_2 , SO_2 , and PM. Reductions in ROG emissions can be calculated by multiplying the percent reduction in GHG emissions (A) by an adjustment factor of 87 percent. See *Adjusting VMT Reductions to Emission Reductions* above for further discussion.



Energy and Fuel Savings

The percent reduction in vehicle fuel consumption would be the same as the percent reduction in GHG emissions (A).



VMT Reductions

The percent reduction in VMT would be the same as the percent reduction in GHG emissions (A).



Sources

- California Department of Transportation (Caltrans). 2012. *California Household Travel Survey (CHTS)*. Available: <https://www.nrel.gov/transportation/secure-transportation-data/tsdc-california-travel-survey.html>. Accessed: January 2021.
- Chatman, D. 2013. Does TOD need the T? On the importance of factors other than rail access. *Journal of the American Planning Association* 79(1). Available: <https://trid.trb.org/view/1243004>. Accessed: January 2021.
- Institute of Transportation Engineers (ITE). 2019. *Parking Generation Manual*. 5th Edition. February. Available: <https://ecommerce.ite.org/IMIS/ItemDetail?iProductCode=PG5-ALL>. Accessed: May 2021.