

VMT Mitigation Strategies Worksheet

1. Pricing

Gas prices/taxes

Parking pricing

- parking fees
- unbundled parking costs
- limit parking supply
- parking permitting

Road user pricing

- facility tolling
- cordon tolling
- distance pricing

2. Programs/Education

Voluntary travel behavior change programs

- media/communication campaigns
- travel feedback programs

Telecommuting

Employer-based trip reduction programs

- rideshare facilitation
- vanpool/shuttle
- transit subsidy
- rideshare subsidy
- financial incentive for active commuters
- facilities for active commuters
- parking cash-out
- price workplace parking
- alternate work schedules

3. Land Use

Employment density

- revise floor-area ratios
- revise minimum parking requirements

Residential density

- increase minimum lot size requirements
- increase allowable densities
- zoning
- public finance mechanisms

Transit access

- service expansion
- increase frequency/headways
- service optimization
- fare reductions

Land use mix (diversity)

- project-level diversity
- area-level diversity

Regional accessibility

Jobs/housing balance

Affordable housing

4. Transportation

Transit services/access

- service expansion & adjustments
- BRT

Bicycle facilities

- lanes, trails, routes
- parking
- bike share
- end-of-trip facilities

Pedestrian strategies

- infrastructure (sidewalks, paths)
- street lighting, trees, furniture
- traffic calming

Car-sharing

1. Pricing

Strategy	Change in VMT*
<p>Gas Prices/Taxes Modification of gas price via policy. Short run travel behavior may change to increase fuel economy and/or decrease vehicle trips. Long run travel behavior may change through vehicle, housing, and/or employment choice.</p>	<p>0 –2.72% decrease per 1% increase in gas price over the long runⁱ</p>
<p>Parking Pricing Increasing existing parking prices, or charging for parking that is currently offered for free, which can encourage mode switching by increasing the cost of private vehicle trips. Parking policies can include unbundled parking costs from property costs, market-based public parking (e.g. Pasadena), permitting, etc. Elasticities were measured for urban contexts.</p>	<p>0.12 – 12.5% decrease per 1% increase in parking priceⁱⁱ</p>
<p>Road User Pricing Road user pricing aims to affect the amount, time, or place that people travel. It takes three basic forms: (1) link or point charging (e.g., toll roads and bridges), (2) cordon toll (e.g., drivers charged when crossing boundary of predefined area), and (3) distance charging (e.g., users pay according to distance driven on predefined road network).</p>	<p>Decrease per 1% increase in road price:ⁱⁱⁱ</p> <ol style="list-style-type: none"> 1. 0.03 – 0.36% 2. 12 – 30% 3. 9 – 19%

* The change in VMT per “unit of strategy” is called elasticity. For example, for a 1% increase in parking pricing, VMT has been measured to decrease by 0.12 to 12.5%.

e) Political acceptability - How acceptable is this family of strategies to your constituency? To the wider region? Reference individual strategies as necessary.

f) Geopolitical acceptability - Where in the SCAG region will this family of strategies work best to reduce VMT? Reference individual strategies as necessary.

g) Other comments - Any issues or ideas that address VMT mitigation that don't fit in the categories above.

h) Unanswered questions - Note unanswered questions, or points of major disagreement here for reference later as needed.

2. Programs/Education

Strategy	Change in VMT*
<p>Voluntary Travel Behavior Change Programs These are a range of travel demand management techniques that are designed to change the behavior of travelers without changing the options available to them. They fall into two broad categories: communication campaigns and travel feedback programs. TFPs use information such as travel diaries to encourage participants to actively examine their travel behavior and its impacts.</p>	<p>5 – 12% decrease as result of VTBC program^{iv}</p>
<p>Telecommuting The practice of working from home or other nearby location by employees who have a regular work place.</p>	<p>48 – 90.3% decrease per telecommuter per telecommute day^v</p>
<p>Employer-Based Trip Reduction Programs Typically include some combination of the following elements, usually chosen by firms to suit their specific context: rideshare or vanpool facilitation, transit subsidy, carpool subsidy, financial incentive for bicycle or pedestrian commuters, parking “cash-out”, facilities (e.g. showers) for active commuters, alternate work weeks, etc.</p>	<p>1 – 15% decrease in commute VMT as result of trip reduction program^{vi}</p>

* The change in VMT per “unit of strategy” is called elasticity. For example, a 1% increase in employer-based trip reduction programs was correlated with a 1-15% decrease in commute VMT.

e) Political acceptability - How acceptable is this family of strategies to your constituency? To the wider region? Reference individual strategies as necessary.

f) Geopolitical acceptability - Where in the SCAG region will this family of strategies work best to reduce VMT? Reference individual strategies as necessary.

g) Other comments - Any issues or ideas that address VMT mitigation that don't fit in the categories above.

h) Unanswered questions - Note unanswered questions, or points of major disagreement here for reference later as needed.

3. Land Use Strategies

Strategy	Change in VMT*
<p>Employment Density Employment density is usually measured as the ratio of the number of employees divided by land area (e.g., employees per acre or employees per square mile). Employment density can be measured at different scales (e.g. census tract, traffic-analysis zone (TAZ), neighborhood, or city).</p>	<p>-0.11 – +0.07% per 1% increase in employment density (see source)^{vii}</p>
<p>Residential Density Density policies include direct changes to land use, such as relaxing minimum lot size requirements, increasing the density of allowed development, and encouraging urban infill. More broadly, officials can encourage higher density through combinations of infrastructure, zoning, or public finance policies that, for example, focus development around transportation nodes (including transit stations) or raise land prices and hence encourage smaller lot sizes as a result of impact fees.</p>	<p>0.07 – 0.14% decrease per 1% increase in population density^{viii}</p>
<p>Distance to Transit (Transit Access) Transit agencies can increase transit access by providing new service or reroute existing services to new areas, thereby bringing transit closer to potential users. Transit access also increases when communities increase the density of housing and other land-uses within walking distance of stations</p>	<p>0.8 – 13.3% decrease per 1 mile closer to transit station (see source)^{ix}</p>
<p>Land-Use Mix (Diversity) Land-use mix or mixed-use development can be defined as the practice of accommodating more than one type of function within a building, a set of buildings, or a specific area. These functions include residential, office, retail, and personal services, as well as parks and open space</p>	<p>0.01 – 0.17% decrease per 1% increase in land-use mix (see source)^x</p>
<p>Network Connectivity From the transportation standpoint, network connectivity is defined with respect to the directness of connections to potential destinations. The structure of the street network, defined in terms of the patterns of streets and intersections, determines the directness of these connections, which often differ by mode (e.g. vehicles versus bicycles).</p>	<p>(See source)^{xi}</p>

<p>Regional Accessibility This can be defined as the ease with which destinations can be reached throughout a region. The proximity of a residence to potential destinations, such as jobs, shopping, and leisure-time activities, and the nature of the transportation links to those destinations together determine accessibility. Community types (e.g. urban, compact infill, suburban center, etc.) commonly used as proxy for regional accessibility.</p>	(See source) ^{xii}
<p>Jobs-Housing Balance As a transportation policy tool, this metric is premised on the idea that when residence and work locations are closer together, people’s travel distance to and from work will be reduced. Jobs-housing balance is typically measured by the ratio of the number of jobs divided by either the number of employed residents, persons, or houses in a geographic area.</p>	(See source) ^{xiii}
<p>Incorporation of Affordable Housing Income is still a significant factor in the likelihood of someone to walk or take transit to work.</p>	0.04 – 1.2% decrease per affordable housing unit ^{xiv}

* The change in VMT per “unit of strategy” is called elasticity. For example, a 1% increase in residential population density, independent of other strategies, was correlated with a 0.07 to 0.14% decrease in VMT.

Discussion of Land Use Strategies

- a) **Effectiveness** - How well will this family of strategies work to mitigate VMT in various places in the region? Why? Reference individual strategies as necessary.

- b) **Technical feasibility** - What questions do you have about the technical implementation of the strategies?

- c) **Expense/cost** - What are your thoughts on the expense of implementing certain strategies relative to other strategies or families of strategies?

- d) **Credibility** - How is this family of strategies, or individual strategies, perceived by your constituents/constituencies?

e) **Political acceptability** - How acceptable is this family of strategies to your constituency? To the wider region? Reference individual strategies as necessary.

f) **Geopolitical acceptability** - Where in the SCAG region will this family of strategies work best to reduce VMT? Reference individual strategies as necessary.

g) **Other comments** - Any issues or ideas that address VMT mitigation that don't fit in the categories above.

h) **Unanswered questions** - Note unanswered questions, or points of major disagreement here for reference later as needed.

4. Transportation Strategies

Strategy	Change in VMT*
<p>Transit Service/Access Transit-related strategies include three general categories: service and headway/frequency increases, system expansion/optimization, and fare reductions.</p>	0.17 – 1% increase in bus ridership per 1% increase in transit (see source) ^{xv}
<p>Bicycle Strategies Strategies that facilitate increased bicycle use fall into two main categories: (1) infrastructure projects that improve bicycle accessibility, safety, and convenience, either while traveling or at the end of the trip, and (2) programs that promote bicycling directly or indirectly through education, community events, advertising, and other activities.</p>	1) 0.3 – 3.2% increase in bicycle commuting per 1% increase of infrastructure; 2) 25-100% increase in bicycling after program ^{xvi}
<p>Pedestrian Strategies Strategies to improve the walking environment include pedestrian infrastructure, street trees and lighting to make walking more comfortable, traffic calming techniques, and promotional programs (e.g. Safe Routes to School).</p>	0.09 – 2% increase in walking trips/mode share per pedestrian strategy (see source) ^{xvii}
<p>Carsharing Carsharing refers to a specific type of service that offers members short-term vehicle access. Example networks include Zipcar, City CarShare, Car2go, Scoot (scooters), et cetera.</p>	26 – 68% decrease in VMT per carshare member ^{xviii}

* The change in VMT per “unit of strategy” is called elasticity. For example, a 1% increase transit service/access was shown to result in a 0.17 – 1% increase in bus ridership.

Discussion of Transportation Strategies

a) **Effectiveness** - How well will this family of strategies work to mitigate VMT in various places in the region? Why? Reference individual strategies as necessary.

b) **Technical feasibility** - What questions do you have about the technical implementation of the strategies?

c) **Expense/cost** - What are your thoughts on the expense of implementing certain strategies relative to other strategies or families of strategies?

d) **Credibility** - How is this family of strategies, or individual strategies, perceived by your constituents/constituencies?

e) **Political acceptability** - How acceptable is this family of strategies to your constituency? To the wider region? Reference individual strategies as necessary.

f) **Geopolitical acceptability** - Where in the SCAG region will this family of strategies work best to reduce VMT? Reference individual strategies as necessary.

g) **Other comments** - Any issues or ideas that address VMT mitigation that don't fit in the categories above.

h) **Unanswered questions** - Note unanswered questions, or points of major disagreement here for reference later as needed.

Endnotes:

- ⁱ arb.ca.gov/cc/sb375/policies/gasprice/gasprice_brief.pdf
- ⁱⁱ arb.ca.gov/cc/sb375/policies/pricing/parking_pricing_brief.pdf
- ⁱⁱⁱ arb.ca.gov/cc/sb375/policies/pricing/road_pricing_brief.pdf
- ^{iv} arb.ca.gov/cc/sb375/policies/vtbc/vtbc_brief120313.pdf
- ^v arb.ca.gov/cc/sb375/policies/telecommuting/telecommuting_brief120313.pdf
- ^{vi} arb.ca.gov/cc/sb375/policies/ebtr/ebtr_brief.pdf
- ^{vii} arb.ca.gov/cc/sb375/policies/empldens/employment_density_brief.pdf
- ^{viii} arb.ca.gov/cc/sb375/policies/density/residential_density_brief.pdf
- ^{ix} arb.ca.gov/cc/sb375/policies/transitaccess/transit_access_brief120313.pdf
- ^x arb.ca.gov/cc/sb375/policies/mix/lu-mix_brief.pdf
- ^{xi} arb.ca.gov/cc/sb375/policies/connectivity/network_connectivity_brief.pdf
- ^{xii} arb.ca.gov/cc/sb375/policies/regaccess/regional_accessibility_brief120313.pdf
- ^{xiii} arb.ca.gov/cc/sb375/policies/jhbalance/jhbalance_brief.pdf
- ^{xiv} capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
- ^{xv} arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf
- ^{xvi} arb.ca.gov/cc/sb375/policies/bicycling/bicycling_brief.pdf
- ^{xvii} arb.ca.gov/cc/sb375/policies/ped/walking_brief.pdf
- ^{xviii} arb.ca.gov/cc/sb375/policies/carsharing/carsharing_brief.pdf