Reducing VMT through Land Use Policies: The Research Perspective

Susan Handy

2011 Asilomar Conference on Transportation and Energy
Redesigning Communities to Reduce Greenhouse Gases

Targets for GHG emissions reduction from cars and trucks for metropolitan areas, by reducing vehicle-miles-travelled (VMT)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Area</td>
<td>7%</td>
<td>15%</td>
</tr>
<tr>
<td>Sacramento</td>
<td>7%</td>
<td>16%</td>
</tr>
<tr>
<td>LA region</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>San Diego</td>
<td>7%</td>
<td>13%</td>
</tr>
</tbody>
</table>
### Elasticities for BE and VMT

<table>
<thead>
<tr>
<th>Factor</th>
<th>Weighted average</th>
<th>Range across studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job density</td>
<td>0</td>
<td>0 to 0.02</td>
</tr>
<tr>
<td>Jobs-housing balance</td>
<td>-0.02</td>
<td>-0.09 to 0.03</td>
</tr>
<tr>
<td>Household/population density</td>
<td>-0.04</td>
<td>-0.12 to 0</td>
</tr>
<tr>
<td>Job accessibility by transit</td>
<td>-0.05</td>
<td>-0.10 to -0.03</td>
</tr>
<tr>
<td>Proximity to nearest transit stop</td>
<td>-0.05</td>
<td>-0.19 to -0.01</td>
</tr>
<tr>
<td>Land use mix</td>
<td>-0.09</td>
<td>-0.27 to -0.01</td>
</tr>
<tr>
<td>Intersection/street density</td>
<td>-0.12</td>
<td>-0.29 to -0.04</td>
</tr>
<tr>
<td>Percent 4-way intersections</td>
<td>-0.12</td>
<td>-0.15 to 0</td>
</tr>
<tr>
<td>Job accessibility by auto</td>
<td>-0.20</td>
<td>-0.31 to -0.03</td>
</tr>
<tr>
<td>Distance to downtown</td>
<td>-0.22</td>
<td>-0.27 to -0.20</td>
</tr>
</tbody>
</table>

Ewing and Cervero, Journal of the American Planning Association, 2010
# Research Briefs for Cal ARB

Boarnet, Handy, Spears, Tal

## Land Use-Related Policies

<table>
<thead>
<tr>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Density</td>
</tr>
<tr>
<td>Land Use Mix</td>
</tr>
<tr>
<td>Jobs-Housing Balance</td>
</tr>
</tbody>
</table>

## Transportation-Related Policies

<table>
<thead>
<tr>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Pricing</td>
</tr>
<tr>
<td>Road User Pricing</td>
</tr>
<tr>
<td>Transit Service</td>
</tr>
<tr>
<td>Pedestrian Strategies</td>
</tr>
<tr>
<td>Bicycle Strategies</td>
</tr>
<tr>
<td>Employer-Based Trip Reduction</td>
</tr>
<tr>
<td>Telecommuting</td>
</tr>
<tr>
<td>Voluntary Travel Behavior Change Programs</td>
</tr>
<tr>
<td>Traffic Incident Clearance Programs</td>
</tr>
</tbody>
</table>
Association =
differences in land use associated with
differences in travel
Causal Effect =
Changes in land use lead to changes in travel
Self-Selection Effect = Preferences for travel influence type of neighborhood chosen
“careful before-and-after studies of policy interventions to promote more compact, mixed-used development to help determine what works and what does not”

“Natural experiments”

“Intervention studies”

“Policy evaluation”
California SR2S Study – UC Irvine

- Parents of 3rd and 5th graders surveyed before and after improvements
- Traffic counts and driver behavior before and after improvements
- *Increases in walking/bicycling at 5 out of 10 schools*

RESIDE Study – UWA, Perth

- 2003-2008
- 5000 new home builders invited to participate
- Surveys before move, one year after, two years after
- Environmental audits for BE characteristics
- *Steps per day did not change*
Davis Studies

Target Store opening:
Shopping patterns before and after

Fifth Street Road Diet:
Mode split to downtown and bike/ped safety before and after

West Village Project:
Travel patterns before-and-after moving in
Evidence Cycle

- Best Practices
- Policy Adoption
- Evaluation
Built Environment
e.g. mixed use

Travel Behavior
e.g. VMT
Location preference
  e.g. within walk distance

Built Environment
  e.g. mixed use

Travel Behavior
  e.g. VMT
Location preference
  e.g. store w/in walk distance

Built Environment
  e.g. mixed use

Travel Behavior
  e.g. VMT

Travel preference
  e.g. likes to walk to store
Interest in Living in Walkable Community

Source: Handy, Sallis, et al., 2008
Policy
- e.g. mixed-use zoning

Built Environment
- e.g. mixed use

Travel Behavior
- e.g. VMT
State Policy
  e.g. VMT targets
Local Policy
  e.g. mixed-use zoning
Built Environment
  e.g. mixed use
Travel Behavior
  e.g. VMT
Regional Policy
- e.g. Funding programs

State Policy
- e.g. VMT targets

Local Policy
- e.g. mixed-use zoning

Built Environment
- e.g. mixed use

Travel Behavior
- e.g. VMT
Regional Policy  
  e.g. Funding programs

Local Policy  
  e.g. mixed-use zoning

State Policy  
  e.g. VMT targets

Built Environment  
  e.g. mixed use

Travel Behavior  
  e.g. VMT
Share of Federal $ for Bike/Ped

Sacramento  2.5%  
Minneapolis  2.5%  
Orlando  3.0%  
Denver  1.5%  
Baltimore  1.0%  
Memphis  0.5%  

Source: Handy and McCann, 2011
“the capacity to understand things, and... the closely related capacity to make things happen”

- David Albert, NYT Book Review, 8/12/11
Immediate Questions

• How do we most effectively get the available evidence that we do have into the hands of policy makers?

• We can’t afford to wait for all the evidence... but how can we ensure that we’re evaluating the policies that are adopted, to build an evidence base?
Thanks!

Questions? slhandy@ucdavis.edu