



Caltrans Division of Research,
Innovation and System Information

Research



Results

Planning, Policy,
and Programming

Transit Oriented Development

Exploring Unintended Environmental and Social-Equity
Consequences of Transit Oriented Development

WHAT IS THE NEED?

Communities throughout the U.S. are pursuing land use and transportation plans that locate high density, mixed-use development near high quality rail and bus transit service. The objective of these plans is to meet important community goals, such as economic development, reduced congestion, greater transportation choice, and improved public health. These plans may also be critical to managing the growth in passenger travel necessary to meet greenhouse gas (GHG) reduction goals and avoid the most devastating damage to human and natural systems from climate change. Increasingly, however, there is concern that these plans may have unanticipated consequences that could undermine the well-being of low-income groups and GHG reductions.

WHAT WAS OUR GOAL?

The goal was to evaluate the equity and greenhouse gas emission effects of a land use and transportation plan that includes transit oriented development. Another goal was to illustrate how advanced land use and transportation models can be applied to evaluate these effects.

WHAT DID WE DO?

This study uses a spatial economic model developed for the Sacramento region (Sacramento PECAS) and an advanced travel demand model to simulate a land use and transportation plan from 2014 to 2030. We examine the plan's effect on population, housing, rents, and consumer surplus by location and income class over time and changes in travel behavior. We use the EMFAC emissions model with the travel behavior output to measure changes in on-road vehicle GHG emissions. In addition, a lifecycle assessment model uses the economic activity output

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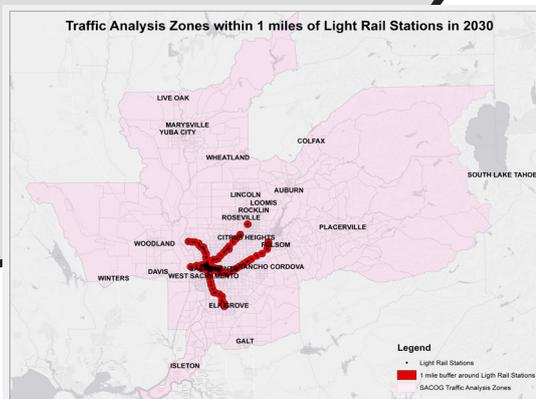
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Transit Oriented Development

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from the simulated scenario to estimate changes in upstream and downstream GHG emissions.

WHAT WAS THE OUTCOME?

- Average zonal population and employment density and land use mix is larger in the TOD areas relative to the region and the difference grows from 2016 to 2030 (by 54% and 61%, respectively).
- In general, more low-income people and households live in TOD areas than other income groups compared to the region. The disparity between the size of growth in the TOD areas and the region is lowest for the low-income group and higher for the high- and medium-income groups. Compared to the region, the share of population and households in the TOD areas is higher for low and medium income groups and lower for the high-income group. Over time, the change these shares are consistent or differ by only one percentage point across income groups. These results do not suggest displacement of low-income groups in the TOD areas.
- From 2014 to 2030, medium income households' mean rents move closer to their regional mean while low income and high income households' mean rents move above their regional mean. These differences are relative small and within the margin of model error. However, they could suggest some upward pressure on rents over time for low-income households, which could possible lead to displacement in the future. In general, all regions should monitor changes in TOD rents over time and take steps ensure affordable low-income housing.
- Total and mean household consumer surplus in TOD areas suggest that all income groups experience disproportionately positive and approximately equal benefits relative households in the region.

- Total VMT and GHGs for on-road emission without California clear-car and low carbon fuel standards increase over time in the region, but per capita levels decrease.
- In sum, over a 16-year time horizon, the land use and transportation scenario does reduce per capita VMT and GHGs. In 2030, there is no evidence of low-income displacement from TOD policies.

WHAT IS THE BENEFIT?

State and regional governments and their stakeholders are very concerned about the potential equity effects of transit oriented development and, to date, there is very little research that explores this subject. Senate Bill 375 requires regional governments to develop land use and transportation plans that typically include transit oriented development to reduce the growth in greenhouse gas emissions from passenger vehicle travel. This study provides insight into the direction and magnitude of equity and greenhouse gas effects of transit oriented development policies over a 16-year time horizon at a regional scale. The study also illustrates how newly available spatial economic and travel models can be used to analyze multiple measures of equity and GHG emissions.

LEARN MORE

Review the complete report.
<http://ncst.ucdavis.edu/project/ucd-ct-to-006/>
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