Developing Affordable Housing Guidelines Near Rail Transit in Los Angeles

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Project Objective

Providing affordable housing and reducing greenhouse gases are common goals in cities worldwide. Transit-oriented development (TOD) can enable incremental progress on both fronts, by building affordable housing near transit and by providing alternative transport modes such that households reduce driving. Our research gives evidence that planners should focus on both goals jointly to avoid promoting one at the expense of the other. Using Los Angeles as a case study, we develop a scenario planning model which considers both housing and transportation goals and examines tradeoffs between two policy approaches.

Problem Statement

Cities worldwide are struggling to provide affordable housing, while at the same time metropolitan areas aim to reduce greenhouse gas emissions. U.S. cities like Los Angeles are expanding their rail transit networks and developing TODs, which may yield progress toward both goals. We demonstrate, however, that these goals can be in conflict if high income persons reduce their driving the most when moving to TOD locations. We also quantify how various policy options jointly affect both housing affordability and environmental sustainability (i.e. reduced driving). Our overall research question is: How can planners use a region's investment in and around rail transit to advance the dual goals of providing affordable housing and generating environmental benefits in the form of reductions in greenhouse gas emissions?

Research Methodology

To simultaneously simulate progress toward housing and transportation goals in TODs and to illustrate the tradeoffs of different policy approaches, we develop a scenario planning model and apply it Los Angeles' Metro rail system. The model generates new affordable and market rate housing units in TOD areas and simulates the change in driving behavior from moving into a transit-served apartment. The simulations are conducted for various income groups to model the effect on vehicle-miles traveled (VMT), which we use as a proxy for greenhouse gas emissions. Within the model, we examine the effects of density and inclusionary percentage (the fraction of new units that are affordable) on the amount of affordable housing produced. We also tailor development scenarios to a set of five typologies that well describe the Los Angeles Metro rail system. This modeling framework can be used by various constituents and can inform similar policies, processes, and conversations currently taking place in many other large metropolitan areas.

Results

We find that TOD living does promote emissions reduction. We used 2012 California Household Travel Survey data to build a regression model of household VMT controlling for income and residence within or beyond ½ mile from a Metro rail station. We used predicted values from the regression to simulate household moves from beyond to within station half-mile areas. Living in a half-mile station-area TOD can reduce daily VMT by 14.9 miles for the average household (see gray bar on Figure 1). Further, the data suggest a tradeoff between environmental and equity goals. Relatively more affluent households reduce their VMT more than lower-income households when moving to a TOD (Figure 1). Hence making progress on equity and environmental goals would imply a mix of incomes in TOD areas.

There are multiple ways to achieve mixed-income TODs. Our model explores two policy tools: density and inclusionary percentage. We modeled two density increases near L.A. Metro rail stations: a Moderate scenario and an Aggressive scenario. For each density increase, we modeled two inclusionary percentages: 20 percent and 60 percent of new rental units being affordable as defined by the U.S. Department of Housing and Urban Development.

The increased densities proposed by both the Moderate and Aggressive development scenarios are feasible for Los Angeles. The existing residential density in station areas is 8.1 dwelling units (du) per acre. The Moderate scenario raises the average residential density within a half-mile of stations by only 1.5 du / acre or an 18 percent increase in TOD density to an average of 9.6 du/acre. The Aggressive scenario would increase density in half-mile TODs to 14.9 du / acre, or an average increase in density within a half-mile of stations of 6.8 du / acre (84 percent). Figure A1 shows that many station areas already meet the Moderate scenario targets. Figure A2 shows that some station areas are well on their way to meeting the Aggressive scenario.

Figure 2 shows the effects of the two policies. Building at higher density creates more TOD housing units overall, more affordable units, and higher emissions reductions (Aggressive vs. Moderate scenarios). Because high income households near TOD reduce their driving more (relative to living outside of TODs), lower inclusionary percentages give higher emissions reductions but provide fewer affordable units built (20 percent vs. 60 percent). Note, though, that the effect of density increases on both VMT reduction and affordable housing is larger than the effect of inclusionary percentage. The “aggressive density” scenario with 20 percent of units affordable provides two-thirds more affordable housing units and five times the VMT reduction than the low-density “moderate scenario” with 60 percent of units required to be affordable. These results suggest that a policy of low-density development, even if Los Angeles focuses on exceptionally high affordable housing inclusionary requirements, cannot be as effective as a higher density development path with a less aggressive inclusionary percentage. Ultimately, each TOD plan will have its own unique characteristics, but our results illuminate the importance of carefully tailored increases in TOD density in meeting both Los Angeles’ affordable housing and environmental goals.

Figure 1: Predicted VMT Differences between Households Living Within and Outside of 0.5 Miles of a Rail-Transit Station, by Income

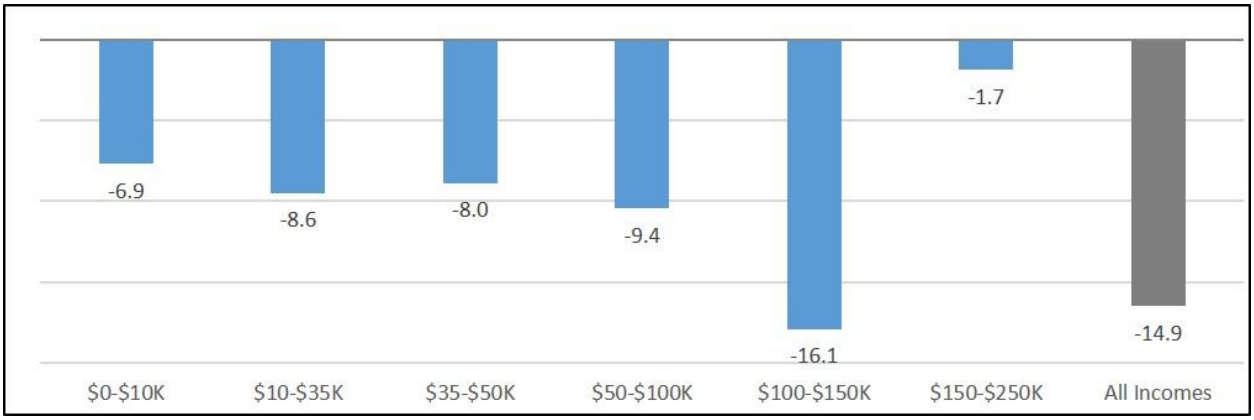
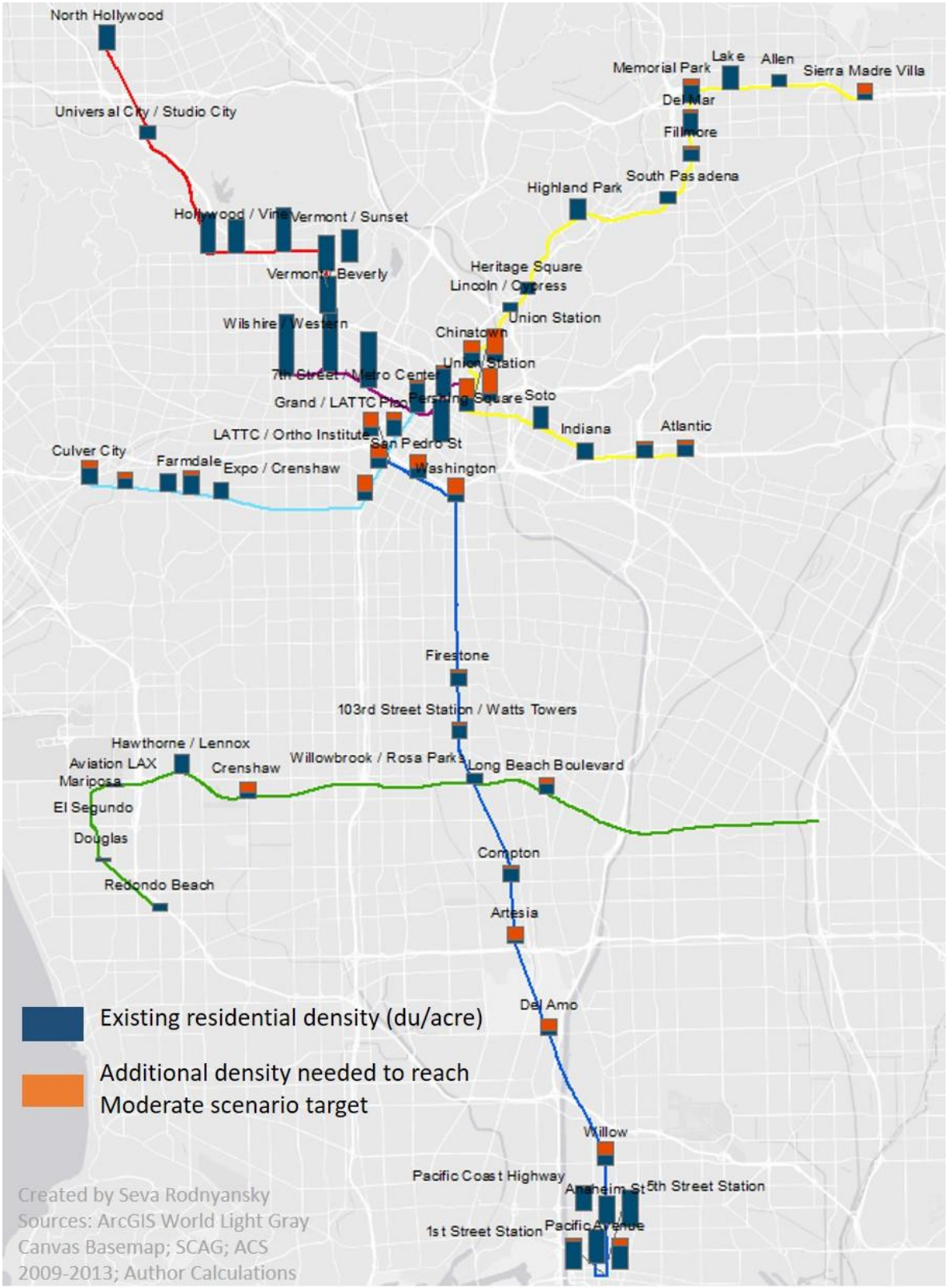


Figure 2: Simulation results by scenario

Density Increase Level	Affordability Option (Inclusionary Percentage)	Total New Units	New Market Rate Units	New Affordable Units	Net Daily VMT Change
Moderate	20% of units affordable	58,375	46,700	11,675	-371,223
	60% of units affordable	58,375	23,350	35,025	-286,998
Aggressive	20% of units affordable	273,222	218,577	54,644	-1,757,701
	60% of units affordable	273,222	109,289	163,933	-1,355,864

Appendix Figure A1: Residential Density by Los Angeles Metro Station Area: Existing vs. Needed to Reach *Moderate* Scenario Target



Appendix Figure A2: Residential Density by Los Angeles Metro Station Area: Existing vs. Needed to Reach *Aggressive* Scenario Target