



CONCLUSIONS

Our project established a baseline of South Coast commute behavior that may be used to measure against future conditions. From our collected survey data we learned:

- 1) GHG emissions and transportation vary by housing type, suggesting high-density housing may be effective at lowering commute-related GHG emissions.
- 2) Commute days, bus characteristics, and gender are important factors when considering why a person chooses to drive to work. A person's commute distance and whether or not (s)he is offered an incentive by his/her employer for using alternative transportation are not enough to explain the person's behavior.
- 3) Parking fees coupled with incentives are effective at switching people into alternative transportation choices. Some transportation modes – i.e. carpooling – are more appealing than others.



RECOMMENDATIONS

Based on our project findings, we have four main recommendations for the City of Santa Barbara:

- 1) Continue with the AUD program and monitor the program's effects on commute behavior. If residents own fewer cars than current downtown residents and/or use alternative transportation more, consider tying the program to the City's Climate Action Plan. Otherwise, focus solely on the affordable housing aspect.
- 2) Carry out information campaigns to improve perception regarding the bus system. However, some system improvements may also be necessary.
- 3) Consider the gender imbalance of commuters. For example, locating daycares near commercial centers or incentivizing employers to offer daycare could make public transportation more feasible for parents.
- 4) Partner with local employers to unbundle the cost of parking for employees (i.e. charging employees to park at or near work), while also helping the employers offer financial incentives for employees commuting by alternative transportation.

ACKNOWLEDGEMENTS

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References

- ¹ SBCAG. (2013). *2040 Regional Transportation Plan and Sustainable Communities Strategy*.
- ² City of Santa Barbara. Municipal Code Title 28 (2014).
- ³ Basemap provided by ESRI, HERE DeLorme, MapmyIndia, OpenStreetMap contributors, and the GIS user community.



More Housing, Fewer Cars: Reducing Commute-Related Emissions on the South Coast

Project Members:
Jenny Bankie, Kaitlin Carney,
Michelle Graff, Amy Stuyvesant

Client: John Campanella
Advisor: Dr. Mark Buntaine

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sbdevelopment@lists.bren.ucsb.edu | www.bren.ucsb.edu



THE PROBLEM

High housing prices in Santa Barbara, exacerbated by population growth and geographic constraints, have created a marked imbalance between jobs and housing on the South Coast. The lack of affordable housing in the City of Santa Barbara has forced employees to reside out of the downtown core in neighboring bedroom communities, leaving them to contend with long work commutes. In addition to the economic and cultural impacts of employees living outside their places of work, the long commutes contribute substantially to the region's greenhouse gas (GHG) emissions; on-road vehicles are responsible for over half of the City's reported GHG emissions.¹

THE PROPOSED SOLUTION

The City of Santa Barbara passed the Average Unit-Size Density (AUD) Incentive Program in 2013 in an effort to address the jobs-housing imbalance. Under the program, developers are allowed to build more housing units on a given parcel of land in certain designated zones.² In addition, the AUD program only requires developments to have one parking space per unit², while also encouraging developments near transit and within walking distance of local services. The City is hopeful that these characteristics, coupled with employees relocating

closer to work, will encourage residents of AUD developments to commute via alternative transportation (by carpool, bus, bicycle, or foot) and thereby reduce local commute-related GHG emissions.

To understand the potential of the AUD program to reduce commute-related GHG emissions, City officials need better knowledge of South Coast residents' commute behaviors and preferences. Additionally, policymakers can benefit from a stronger understanding of what incentives and disincentives could encourage a shift to alternative modes of transportation.

OBJECTIVES

1

Establish a baseline for commute behavior on the South Coast.

2

Examine factors affecting residents' decisions to drive alone to work compared to alternative modes (carpooling, busing, and bicycling).

3

Analyze how employer incentives and parking fees could impact residents' decisions to drive alone to work.



AUD ZONE

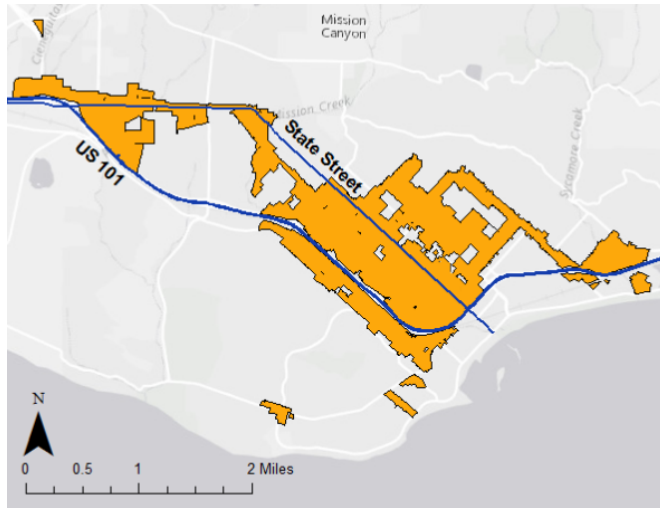


Figure 1. The City's AUD zone, highlighted in orange.³ In accordance with existing zoning, the City has identified "Medium-High Density Residential" and "High Density Residential" zones that are eligible for increased housing densities.² Additionally, certain areas are designated as "Priority Housing" and are allowed an even higher unit density.



SURVEY DESIGN

We distributed 2,500 surveys to residents of Goleta, Santa Barbara, and Carpinteria and received 121 complete responses. The survey aimed to gather data on:

- 1 Current transportation choice, commute distance, bus route, number of carpoolers, car make/model/year, demographics, etc.
- 2 Distance to bus stop, perception of public transit, bike riding ability, offered employer incentives, errands before/after work, etc.
- 3 Choice between driving alone or an alternative transportation mode with a random incentive coupled with a \$0, \$10, or \$15 daily parking fee.



COMMUTE BEHAVIOR & ASSOCIATED EMISSIONS

Apartments Single Family Homes

8 miles VS. **12 miles**

48% VS. **68%**

15% VS. **2%**

Apartment and single family home residents differed significantly in their median commute distances and transportation choices. Apartment residents commuted shorter distances, drove less, and walked more than residents of single family homes. There was no major difference for the other transportation modes.

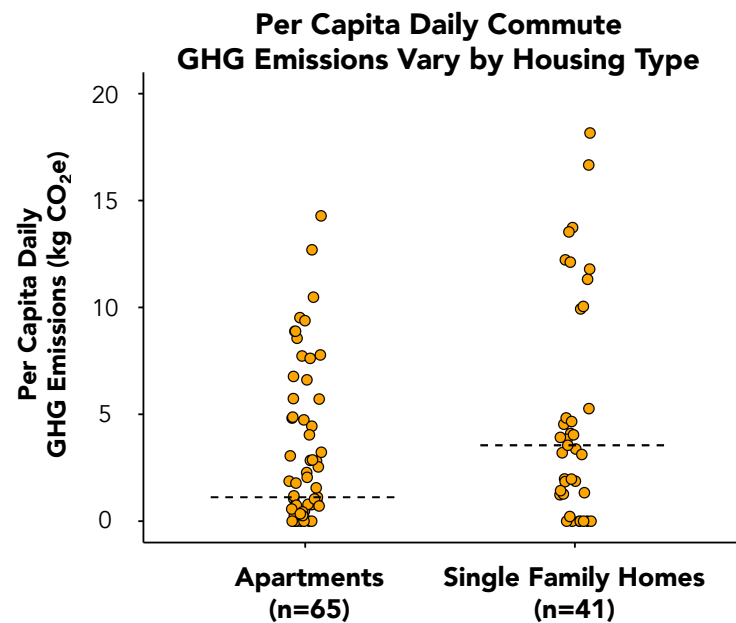


Figure 2. Each dot represents the daily commute-related GHG emissions for one respondent, and dashed lines indicate median emissions values (apartments = 1.1 kg CO₂e, single family homes = 3.5 kg CO₂e). Note that the graph excludes two single family home respondents at 24.9 and 37.8 kg CO₂e.



WHY DO RESIDENTS DRIVE ALONE?



As a person's **commute days** increase, (s)he is more likely to drive



A person who views the bus as **very unpredictable** is highly likely to drive



Not knowing the **number of bus transfers** makes someone more likely to drive



Women are more likely to drive than men

A person's commute distance has seemingly no impact on his/her decision to drive alone to work. This is most likely due to the fact that while some residents drive over 20 miles, others drive only 3 or 4 miles, making distance irrelevant. Secondly, having an employer offer an incentive was not predictive. This may be because not enough employers are offering incentives.

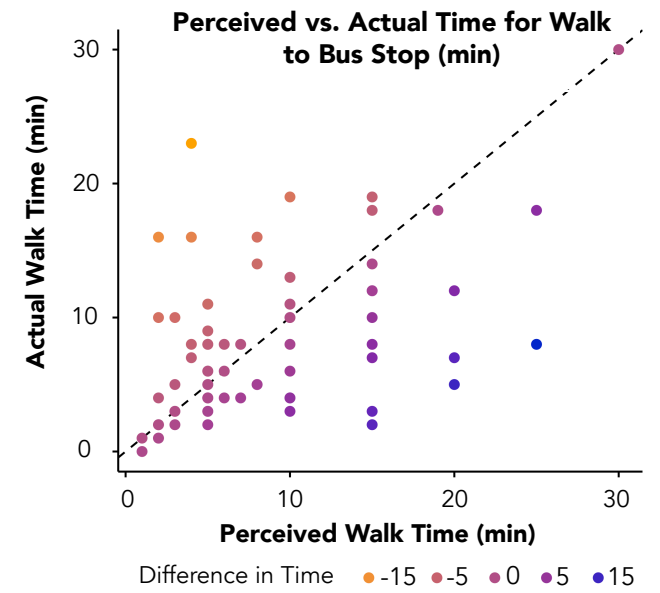


Figure 3. Respondents' perceived walk times to their nearest bus stop compared to their actual walk times in minutes. Light oranges and pinks represent respondents who underestimate their walk times, while dark purples and blues represent those who overestimate their walk times.



EMPLOYER INCENTIVES & PARKING FEES

Parking Fees Disincentivize Driving Alone to Work & Encourage Use of Alternative Transportation

As the parking fee increased, more respondents chose to bike, and fewer chose to drive.

