Calculation of and Methods for Reducing Commuting CO_2 Emissions at UC Davis Sacramento Medical Center

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Abstract

What: Calculate commuting CO_2 emissions savings, improve incentives.

Why: To reduce carbon footprint of UCDMC per the CAP.

How: Analyze parking permit data and perform survey.

The UC Davis Medical Center in Sacramento (UCDMC) has implemented a program to incentivize commuters to take alternate, greener, modes of transportation to campus in an effort to reduce the carbon footprint of commuting. To measure the program's effectiveness, the CO_2 emissions reduction due to the program had to be calculated. We examined commute data for affiliates of the UCDMC in order to calculate the CO_2 emissions associated with commuting and the reduction due to the incentives program. The total commuting emissions were found to be 27.1 Mkg CO_2, and the reduction due to the incentives was 0.7Mkg CO_2. Additionally, we prepared a list of improvements to the program that would likely increase membership and thus CO_2 savings.

Methods

Parking permit applications provided commute mode and zip code data. MapQuest was used to find the driving distance to UCDMC from each zip code. Fuel economy was measured by taking a sample of 197 vehicles from 4 parking lots at UCDMC which allowed estimation of CO_2 production. The baseline CO2 was calculated by assuming all commuters drove alone, and compared to the current mode split. The CO2 savings directly related to the Green Commuter Incentives program was also calculated using a survey distributed to the program's members

The Green Commuter Program

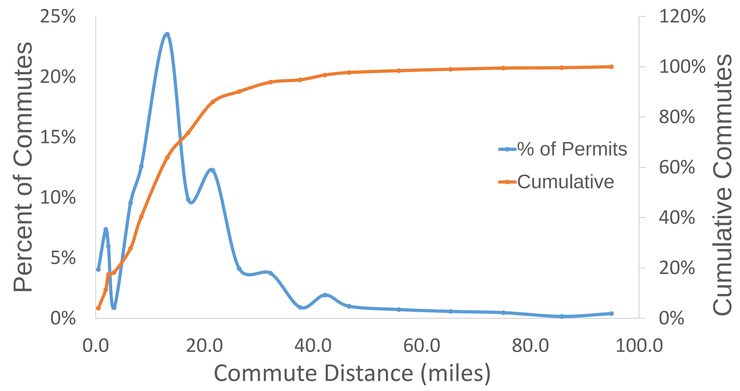
Commute by ZipCar, Sacramento Regional Transit, bike, walk, carpool, vanpool or UCDMC shuttle for discounted travel and free parking.

CO_2 Results Summary

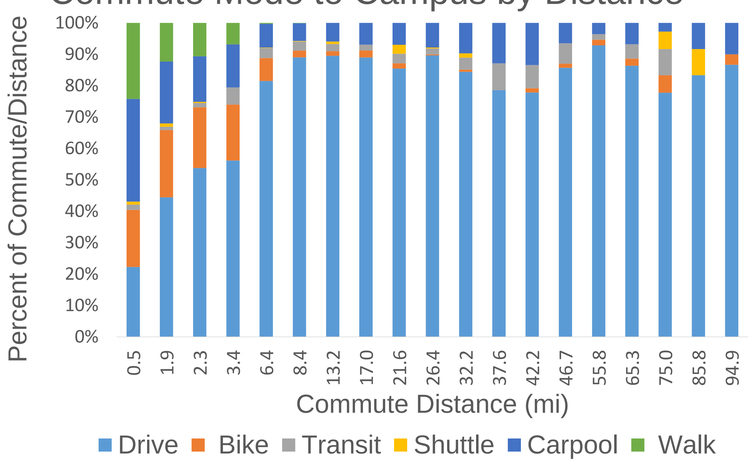
Summary of Results For 24.4 MPG	CO2 (Mkg/year)	CO2 Reduction (Mkg/year)
Baseline	29.8	0
Baseline (Green)	2.0	0
Current	27.1	2.7
Current (Green)	1.3	0.7

Results

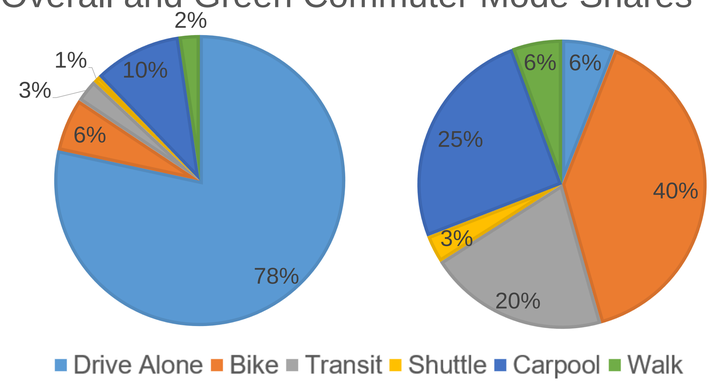
Commute Distance to Campus



Commute Mode to Campus by Distance



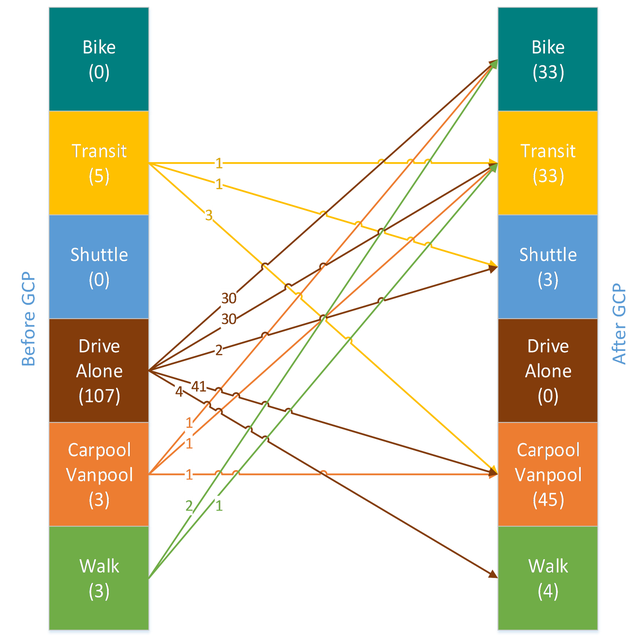
Overall and Green Commuter Mode Shares



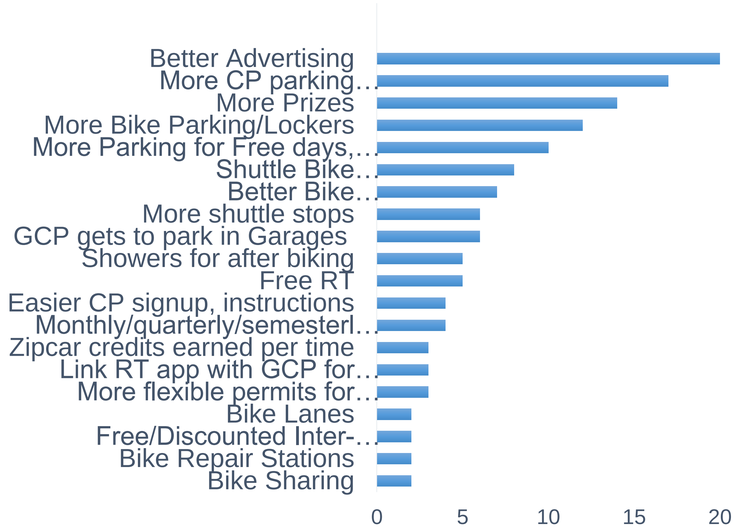
Estimated CO2 savings from the GCP

	Baseline CO2 (kg)	After Incentives CO2 (kg)	CO2 Reduction (kg)	% Reduction
Sample	376,839	215,879	160,960	43%
Population	2,006,304	1,149,348	856,956	43%
Assuming GCP members use 50% of their free parking days [24 days / year]				
Population	2,006,304	1,312,837	693,467	34.6%

Effect of Green Commuter Incentives



Suggestions for Improvement



- Hire a data analyst to assist Sarah Janus
- Target different advertisements at specific zip codes.
- Pay daily for parking permits
- Vanpool: Reduce the minimum distance and allow non-neighboring zip-codes.
- Make parking more expensive for those who live close to the campus [e.g. less than 5 miles]
- Increase the number of parking spots for carpoolers (reduce for lonely drivers)
- Increase the amount of bike lockers
- Increase the number of shuttles and shuttle stops