UNIVERSITY OF CALIFORNIA

The Potential for Shared Use Mobility in Affordable Housing Complexes in Rural California

A Final Research Report from the University of California Institute of Transportation

Susan Pike, Ph.D., Post-Doctoral Researcher, Institute of Transportation Studies

Caroline Rodier, Ph.D., Research Scientist, Institute of Transportation Studies

Jose Martinez, Undergraduate Student Researcher, Institute of Transportation Studies

October 2018

PROJECT ID: UC-ITS-2017-09 | DOI: 10.7922/G2K935PV

ITS UCDAVIS
INSTITUTE OF TRANSPORTATION STUDIES

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. UC-ITS-2017-09	**2. Government Accession No.** N/A	**3. Recipient's Catalog No.** N/A
4. Title and Subtitle The Potential for Shared Use Mobility in Affordable Housing Complexes in Rural California		**5. Report Date** October 2018
		6. Performing Organization Code ITS-Davis
7. Author(s) Susan Pike, Ph.D. (https://orcid.org/0000-0001-6558-3479), Caroline Rodier, Ph.D. (https://orcid.org/0000-0002-9107-5547), and Jose Martinez		**8. Performing Organization Report No.** UCD-ITS-RR-17-17
9. Performing Organization Name and Address Institute of Transportation Studies, Davis 1605 Tilla Street Davis, CA 95616		**10. Work Unit No.** N/A
		11. Contract or Grant No. UC-ITS-2017-09
12. Sponsoring Agency Name and Address The University of California Institute of Transportation Studies www.ucits.org		**13. Type of Report and Period Covered** Revised Final Report (August 2016 – October 2018)
		14. Sponsoring Agency Code UC ITS

15. Supplementary Notes
DOI: 10.7922/G2K935PV

16. Abstract
There is very little research on the unmet needs of and transportation alternatives for low-income households in California. A survey of low-income residents at affordable housing complexes in the San Joaquin Valley of California was conducted to explore unmet transportation needs, willingness to use shared mobility services, and the potential to reduce household vehicles and parking spaces. The survey also examined awareness of public financial incentive programs aimed at reducing vehicle emissions in the Valley. The analysis of the survey results suggests the following conclusions: survey respondents successfully marshal their limited transportation resources to travel to activities that are essential to the current or future economic wellbeing of their households; respondents indicate a strong willingness to use ridesourcing and carsharing services located at their affordable housing complex; analysis of the use of respondents' current vehicles and stated willingness to use ridesourcing and carsharing services suggests some potential to reduce parking in the affordable housing complexes; barriers to paying for carsharing and ridesourcing services include lack of credit cards and bank accounts; carsharing and ridesharing programs in these communities should include a call center with staff who speaks both English and Spanish; and survey respondents lack knowledge about public incentive programs that seek to reduce vehicle emissions in the San Joaquin Valley.

17. Key Words Housing, vehicle sharing, travel behavior	**18. Distribution Statement** No restrictions.		
19. Security Classif. (of this report) Unclassified	**20. Security Classif. (of this page)** Unclassified	**21. No. of Pages** 22	**22. Price** N/A

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

ABOUT THE UC ITS

The University of California Institute of Transportation Studies (ITS) is a network of faculty, research and administrative staff, and students dedicated to advancing the state of the art in transportation engineering, planning, and policy for the people of California. Established by the Legislature in 1947, ITS has branches at UC Berkeley, UC Davis, UC Irvine, and UCLA.

ACKNOWLEDGEMENTS

The authors would like to acknowledge and thank the State of California for its support for this project through funding from the Public Transportation Account and the California Air Resources Board for translating the survey into Spanish. We would also like to thank Dan Sperling, Laura Podolsky, and Cassandra Paz from the National Center for Sustainable Transportation and the Institute of Transportation Studies at the University of California at Davis; Betsy McGovern-Garcia and Patrick Isherwood from Self-Help Enterprises; and staff from the California Air Resources Board for their important contributions to this study. The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein.

DISCLAIMER

The Potential for Shared Use Mobility in Affordable Housing Complexes in Rural California

UNIVERSITY OF CALIFORNIA INSTITUTE OF TRANSPORTATION STUDIES

October 2018

Susan Pike, *Institute of Transportation Studies, University of California, Davis*

Caroline Rodier, *Institute of Transportation Studies, University of California, Davis*

Jose Martinez, *Institute of Transportation Studies, University of California, Davis*

[page intentionally left blank]

Table of Contents

PROJECT ID: UC-ITS-2017-09 | DOI: 10.7922/G2K935PV

ITS UCDAVIS
INSTITUTE OF TRANSPORTATION STUDIES

List of Tables and Figures

PROJECT ID: UC-ITS-2017-09 | DOI: 10.7922/G2K935PV

Executive Summary

A survey of low-income residents at affordable housing complexes in the San Joaquin Valley of California was conducted to explore unmet transportation needs, willingness to use shared mobility services, and the potential to reduce household vehicles and parking spaces. The survey also examined awareness of public financial incentive programs aimed at reducing vehicle emissions in the Valley. Our analysis of the survey results suggests the following conclusions.

1. Survey respondents successfully marshal their limited transportation resources to travel to activities that are essential to the current or future economic wellbeing of their households. Only 12% of respondents report that they missed work, 6% missed college/continuing education, and 4% missed K-12 school within the last week due to a lack of transportation. In addition, the survey results suggest that respondents' transportation resources are not sufficient to sustain travel necessary for their physical and emotional health. Approximately 20% of respondents indicate that lack of transportation limits their ability to get medical attention, travel to their preferred grocery store, and visit friends and family.
2. Respondents indicate a strong willingness to use ridesourcing and carsharing services located at their affordable housing complex. Stated demand for carsharing and ridesourcing services range from 25% to 50% for work, higher education, and K-12 travel and is about 70% for shopping, health care travel, and household errands.
3. Analysis of the use of respondents' current vehicles and stated willingness to use ridesourcing and carsharing services suggests some potential to reduce parking in the affordable housing complexes. Respondents indicate that 13% of reported vehicles are never used, 2% are used once a month or less, 6% are used a few times a month, and 5% are used about once a week. Residents who use their vehicle infrequently are more likely to find shared mobility services cost-effective, especially if they are located in their apartment complex.
4. Barriers to paying for carsharing and ridesourcing services include lack of credit cards and bank accounts. Only 59% of respondents have a bank account, and 42% have a credit card. Carsharing and ridesharing programs should include payment options that do not require a bank account or credit card.
5. Only 53% of respondents speak English, and the rest speak Spanish. Carsharing and ridesharing programs in these communities should include a call center with staff who speaks both English and Spanish.
6. Survey respondents lack knowledge about public incentive programs that seek to reduce vehicle emissions in the San Joaquin Valley. Sixty percent had not heard of the "Tune In, Tune Up" program, and 70% had not heard of the sizable electric vehicle rebates

available to them. Targeted outreach and education programs should be expanded to inform affordable housing residents about these programs. Another idea is to provide one-stop shops for ensuring access to information and assistance for the multiple programs for which low-income community members may be eligible.

There is very little research on the unmet needs of and transportation alternatives for low-income households in California. This research has helped inform the California Air Resources Board's efforts on Senate Bill 350 Clean Energy and Pollution Reduction Act of 2015. It has also helped the eight San Joaquin Valley Metropolitan Transportation Agencies design and plan possible pilot programs for implementation with Low Carbon Transportation Investment funds.

Introduction

Conventional fixed-route, fixed-schedule transit services are highly efficient in dense traffic corridors, but not in rural areas where distances to major destinations are long, and development densities are low. Here many residents are unable to afford car ownership and live beyond walking distance to infrequent transit service. As a result, residents may be unable to access jobs, health care, education, supermarkets, and other basic services. Increasingly, community leaders in rural areas are interested in exploring the potential of subsidizing emerging shared-use mobility services, such as carsharing, ridesourcing (e.g., Uber and Lyft), and vanpooling, to meet transportation needs that cannot be cost-effectively served by traditional transit. There is also a strong desire to support emission reduction goals and cleaner transportation in these communities.

In this study, we survey residents of low-income, affordable rental housing complexes in the largely rural San Joaquin Valley region of California to explore residents' current unmet transportation needs, willingness to use shared-use mobility services, and the potential for such services to reduce household vehicles and parking spaces at affordable housing developments. The potential for shared-use mobility services in affordable rental housing may be promising for three reasons. First, affordable housing developments are often located in pockets of relatively high density in rural areas and thus may support sustained shared-use service operations. Second, such services may enable affordable housing developers to provide more housing units on the same amount of land in areas where such housing is desperately needed. Carsharing and ridesourcing may provide an alternative to auto ownership, especially when household vehicles are used infrequently. Reduced auto ownership means that less parking will be needed. Third, lower parking infrastructure costs could be used to fund electric vehicle charging infrastructure. The survey also asks residents about their knowledge of financial incentive programs that focus on reducing vehicle emissions in the Valley.

Background

The San Joaquin Valley consists of 27 thousand square miles in central California representing the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, Kings, and Kern. Major metropolitan areas surrounding the Valley include Sacramento to the north, Los Angeles to the south, and the San Francisco Bay Area to the west. It is one of the most productive agricultural regions in the world. While the Valley does include several metropolitan areas, Stockton, Fresno, and Bakersfield, a significant portion of its four million residents live in rural and urban fringe areas where low-income residents are employed in the agricultural sector. The Valley also has some of the nation's worst air quality, which contributes to very high rates of asthma.

Methods

The survey was administered to residents at 20 affordable housing complexes from January to February in 2017 in five counties and 15 communities in California's San Joaquin Valley. See Table 1 below. These properties, developed with federal and/or state subsidies by Self-Help Enterprises, offer affordable rental housing to low-income residents. The income of Self-Help residents ranges from 30% to 80% of area median income. Survey response rates by county range from a high of 24% in Kern County to a low of 12% in Tulare County. The overall response rate is 16%. One member of the household filled out the survey for the entire household. The survey was available in both English and Spanish.

Table 1. Household Units, Completed Household Surveys, and Response Rates by San Joaquin Valley Counties

Counties (cities and *unincorporated communities* in which complexes are located)	**Units**	**Surveys**	**Response Rate**
Fresno (*Biola*, *Del Ray* and Firebaugh)	122	15	12%
Kern (Arvin, *Lamont*, *Oildale* and Wasco)	314	74	24%
Madera (Madera)	136	17	13%
Stanislaus (Modesto and Newman)	100	16	16%
Tulare (Dinuba, *Earlimart*, *Goshen*, *Orosi*, and *Richgrove*)	300	35	12%
Total	972	157	16%

Demographic Attributes

In this section, we compare average demographic attributes of respondent households to those of California and each of the five San Joaquin Valley counties where affordable housing residents were surveyed (i.e., counties of Fresno, Kern, Madera, Stanislaus, and Tulare) from the 2011-2015 American Community Survey (Tables DP02, DP03, and DP04). Table 2 shows that respondents from our survey have significantly higher rates of poverty, larger households with more children, lower levels of education, higher levels of linguistic isolation, lower automobile availability levels, and longer commute distances compared to California and the San Joaquin Valley counties. In general, the survey population is considered transit dependent. However, in many of these communities, the cost of providing traditional transit is very high, and consequently, transit service is hard to access, infrequent and involves long travel times. The transit quality metric[1] provided by the Center for Neighborhood Technology, which ranges

[1] The Center for Neighborhood Technology defines their transit quality metric as follows: "The presence of nearby transit is not enough to fully realize [transit] benefits. Frequent service throughout the day (including weekend and evening hours) and connections to key activity centers (jobs, schools, healthcare, etc.) are characteristics of a good transit system."

from 0 (worst) to 10 (best), for the affordable housing complexes surveyed in the study ranges from zero to two for 40% of survey respondents; two to less than three for 18% of respondents; and three to six for 66% of respondents (Center for Neighborhood Technology, 2016).

Table 2. Comparison of Average Attributes of Survey Respondents to California and the San Joaquin Valley Counties in which Affordable Housing Complexes Are Located

	California	Fresno	Kern	Madera	Stanislaus	Tulare	Survey
Average household size	2.96	3.17	3.21	3.35	3.08	3.38	3.45
% Household members < 18	22.5%	38.2%	33.0%	33.6%	28.2%	37.9%	82.7%
% Household members > 65	10.3%	12.6%	11.1%	11.0%	11.1%	13.0%	6.4%
Household income < $50,000	41.3%	53.9%	50.7%	54.8%	49.9%	57.3%	89.7%
Education							
Less than high school diploma	18.2%	26.5%	26.6%	29.2%	22.8%	31.6%	35.8%
High school diploma	20.7%	22.8%	27.3%	25.1%	28.3%	25.2%	45.7%
Some higher education	29.6%	31.3%	30.8%	32.4%	32.4%	29.3%	11.9%
Bachelor's Degree and higher	31.4%	19.4%	15.4%	13.3%	16.5%	13.8%	6.6%
Language Spoken at Home							
English Only	56.1%	55.9%	56.5%	55.3%	59.1%	49.1%	46.7%
Spanish	28.8%	33.9%	38.6%	41.4%	31.8%	46.7%	53.3%
Vehicles Available							
0	7.70%	9.00%	7.10%	6.60%	7.10%	6.40%	16.5%
1	32.1%	34.3%	31.4%	30.1%	30.5%	31.5%	42.4%
2	37.4%	36.5%	38.3%	36.7%	38.2%	39.1%	29.1%
3+	22.7%	20.2%	23.2%	26.6%	24.2%	22.9%	12.0%
Commute to Work							
Drive Alone	77.5%	80.3%	80.1%	80.9%	83.6%	78.9%	70.2%
Carpool	11.4%	13.3%	14.3%	13.9%	11.8%	16.1%	19.4%
Public Transit	5.5%	1.4%	1.1%	0.4%	1.0%	0.7%	3.2%
Walk	2.9%	1.9%	1.5%	2.6%	1.9%	2.0%	6.5%
Other	2.7%	3.1%	3.0%	2.3%	1.7%	2.3%	0.8%
Mean Travel Time to Work (minutes)	28	22.1	23.6	25.5	27	22.7	33.3

Source: American Community Survey (Tables DP02, DP03, and DP04) for California, Fresno, Kern, Madera, Stanislaus, and Tulare

Survey Results

Access to Opportunities

The survey asked residents questions about their frequency of, and barriers to, traveling to work, college and/or continuing education programs, K-12 schools, grocery stores, medical appointments, and social activities (e.g., visiting friends and family).

Among those respondents who reported frequency household travel to work within the last week, 12% indicated that they missed work because they did not have a way to get there (N=128). The mean travel time was 33 minutes with a mode of 20 minutes (N=95). The most to

the least frequent mode of travel used to travel to work was driving alone (70%), getting a ride or being dropped off (11%), carpool/vanpool (8%), walk and bike (7%), and public transit (3%) (N=124). See Figure 1 below. Among those who missed work, 43% typically drive alone, 36% get a ride or are dropped off, 14% carpool, and 7% take public transit (N=12). See Figure 2.

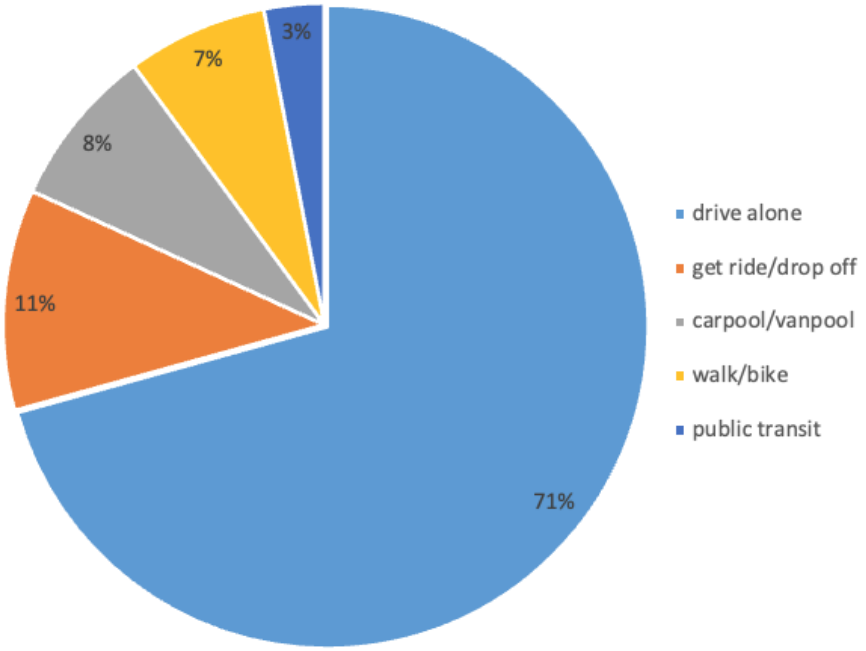

Figure 1. Travel to Work: Mode Share (N=124)

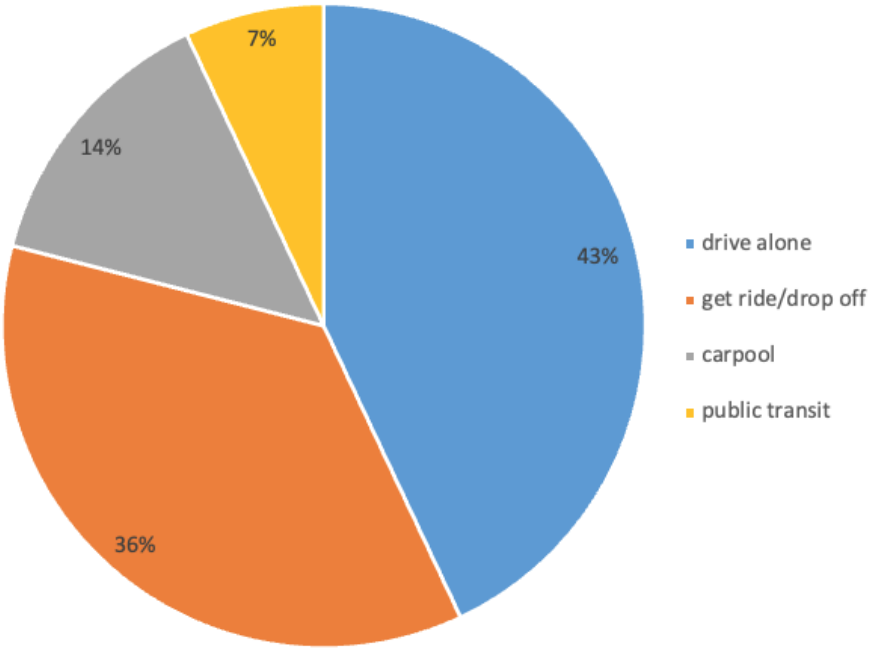

Figure 2. Missed Work: Mode Share (N=12)

Only 23 respondents, or 18% of those that answered this survey question, reported that someone in their household currently attends college or a continuing education program (N=125), and 4% of those 23 respondents (or one respondent) indicated a family member missed a class within the last week. See Table 3 below. Of the 23 households that reported one or more college or continuing education student, 78% (or 18 of the 23 respondents) drive alone to get to classes at least some of the time (of those, 11 do not report any other modes are used; so more than half of those that drive alone do so exclusively). Five households report that these students get a ride, and an additional five report that they carpool at least some of the time; with one household reporting that carpool is the only mode used to get to classes. The remaining modes: bus and walk are used at least some of the time by three households each (with one household exclusively using bus/transit), and taxi, skate/skateboard, and bus or bicycle are each used by one household at least some of the time.

Table 3. Household Mode Use for Travel to College or Continuing Education

Mode (N = 23; total number of respondents with household members in continuing education or college)	**Count of households using this mode**	**Percent of households using this mode**
Walk	3	13%
Skate or skateboard	1	4%
Bicycle	1	4%
Drive alone in a car (or other vehicle)	18	78%
Get a ride / get dropped off	5	22%
Carpool with others	5	22%
Bus or other public transportation	3	13%
Taxi	1	4%

Out of the 157 respondents, 131 gave consistent responses to questions about how many children are in the household (i.e., responses to questions asking about household children less than 18 matched the responses to questions about the number of household members in specific age groups). See Table 4 below. Of those, there are 102 households (or 82%) with children less than 18 in the household, and 92 households, or 70% with school-age children (children 5 to 18 years old).

Respondents were asked whether there were any days last week when their children missed school due to a lack of transportation. Only six families indicated that children missed school in the past week; two reported missing one day, and four reported missing two days. Overall, very few children missed school due to lack of transportation.

We asked respondents to select all of the modes of transportation that children use to travel to school. Each respondent could select more than one mode. Therefore percentages represent the proportion of households that use that mode at least some of the time for children's travel to school. The most commonly reported modes are drive alone and walk; with more than 40%

of families using each of these modes, for at least some children's travel to school. It is likely that some or many of that reporting drive alone, are reporting that they drive their kids to school; rather than the children driving themselves (though this is possible for kids over 16 years old). Taken together with the 33% of households that report the child(ren) get a ride, and the 5% that reported carpool, more than 80% of respondents use auto modes to get their children to school. In addition, 16% of the households, reported traveling by school bus, and a small number of families also use skate/skateboard, bicycle, public transportation, and taxis.

Table 4. Household Mode Use for Children's Travel to School Mode

Household Mode (N = 87; number of respondents who reported at least one mode used for children's travel to school)	**Count of households using this mode**	**Percent of households using this mode**
Walk	36	41%
Bicycle	2	2%
Skate or skateboard	3	3%
Motorcycle or scooter	0	0%
Drive alone in a car (or other vehicle)	38	44%
Get a ride / get dropped off	26	30%
School Bus	14	16%
Vanpool (Calvans or other)	0	0%
Carpool with others	4	5%
Bus or other public transportation	7	8%
On-demand ride services (Lyft/Uber)	0	0%
Taxi	1	1%
Para-transit or Dial-a-ride	0	0%

We asked residents how frequently they traveled to their preferred grocery store over the past three months and whether there were times when they could not travel to their preferred store due to a lack of transportation. Survey responses to these questions are described below in Table 5. Sixty-four percent of respondents reported traveling to their preferred grocery store once a week or more, 26% a few times a month, and about 9% once a month or less. Seventy-eight percent of respondents indicated that there were times during the past three months when they could not go to their preferred grocery store because they lacked the transportation to do so. Responses to this question by travel frequency ranged from 67% for never traveling to their preferred store to 83% for traveling more than once a week. Respondents reported average travel times to their preferred grocery store of 21 minutes with minimum and maximum times of two and 90 minutes, respectively.

Table 5. Travel to Preferred Grocery Store Over Past Three Months

Frequency of travel to preferred grocery store during the past three months			Unable to go to preferred grocery store due to lack of transportation?			
	Count	Percent	No – count and row percent		Yes – count and row percent	
Never	3	2%	1	33%	2	67%
Once a month or less	10	7%	3	30%	7	70%
A few times a month	40	26%	10	25%	30	75%
About once a week	46	30%	10	22%	36	78%
More than once a week	52	34%	9	17%	43	83%
Number of Respondents	**151**	**100%**	**33**	**22%**	**118**	**78%**

Thirty percent of respondents indicated that someone in their household suffered from a medical condition, such as asthma and diabetes, that required regular medical appointments (N=148). See Table 6. Just over half of respondents indicated that household members traveled to medical appointments a few times a month or more, 38% did so once a month or less, and 11% never traveled to appointments. Overall, 81% of respondents indicated that household members missed appointments due to a lack of transportation (N=144). Households with lower travel frequencies to medical appointments were more likely to indicate that they missed appointments due to lack of transportation: 88% for those who never traveled to medical appointments and 85% for those who traveled one a month or less. Forty-four percent of respondents stated that they had to travel to a city that was different from the one in which they live for medical appointments.

Table 6. Travel to Medical Appointments Over Past Three Months

Frequency of travel to medical appointments during the past three months			Missed appointment due to lack of transportation?			
			No		Yes	
	Count	Percent	Count	Percent	Count	percent
Never	16	11%	2	13%	14	88%
Once a month or less	54	38%	8	15%	46	85%
A few times a month	55	38%	11	20%	44	80%
About once a week	10	7%	2	20%	8	80%
More than once a week	8	6%	4	50%	4	50%
Number of Respondents	**144**	**100%**	**27**	**19%**	**117**	**81%**

We asked residents about how frequently they traveled to visit friends and family and whether lack of transportation prevented such trips. Table 7 documents the results of these questions. More than a third of respondents indicated that they travel once a month or less to visit friends and family, 40% did so three or four times a month, and 23% more than once a week. Seventy-eight percent reported that lack of transportation limits their ability to visit friends and family.

Among those who never traveled to visit friends and family, 85% reported that transportation was a barrier to making social trips.

Table 7. Travel to Visit Friends and Family Over Past Three Months

Frequency of travel to visit friends and family over the past three months			Could not visit friends or family due to lack of transportation?			
			No		Yes	
	Count	Percent	Count	Percent	Count	percent
Never	26	18%	4	15%	22	85%
Once a month or less	27	18%	8	30%	19	70%
A few times a month	30	20%	5	17%	25	83%
About once a week	30	20%	9	30%	21	70%
More than once a week	34	23%	6	18%	28	82%
Number of Respondents	**147**	**100%**	**32**	**22%**	**115**	**78%**

Potential for Carsharing and Ridesharing Programs

One of the primary goals of the survey was to determine the level of interest for two shared-use mobility programs among the affordable housing communities' residents. We asked residents about their willingness to use these services. We also asked residents about the vehicles available to their households. Responses to these questions were used to explore the potential for reduced parking demand.

Turning first to household vehicles, and reports of the use of household vehicles, respondents were asked about the year, model, and frequency of use for up to three household vehicles. Year and model information was reported for a total of 158 vehicles among all respondents. The remaining households did not provide information about the year or model of the vehicle(s) they own, however, many additional respondents reported the use of vehicles. This could be because respondents did not want to provide, or were not sure about, the information requested. The year and model were reported for total of 158 vehicles, while the frequency of use was reported for a total of 216 vehicles.

The use of a total of 216 vehicles was reported, across 132 households. Sixty-seven households reported the use of only one vehicle, 64 households reported the use of two, and 19 households reported the use of three vehicles. See Table 8. Eighty-three percent of respondents reported that one household vehicle is used more than once a week, 71% and 37% reported a second and third household vehicle is used more than once a week, respectively. Across all vehicles, respondents indicated that 13% of vehicles are never used, 2% are used once a month or less, 6% are used a few times a month, and 5% are used about once a week.

Table 8. Frequency of Owned Car Use

Frequency of Use	Car #1		Car #2		Car #3		All Household Vehicles	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Never	12	9%	8	12%	7	37%	27	13%
Once a month or less	1	1%	2	3%	1	5%	4	2%
A few times a month	7	5%	5	8%	0	0%	12	6%
About once a week	3	2%	4	6%	4	21%	11	5%
More than once a week	109	83%	46	71%	7	37%	162	75%
Number of Responses	**132**	**100%**	**65**	**100%**	**19**	**100%**	**216**	**100%**

We also asked respondents how frequently they might use a ridesourcing and carsharing service. The services envisioned would be subsidized and located at the affordable housing complex. The ridesourcing service was described as follows in the survey:

> An alternative is to provide a driver or ride services for residents that could be requested at short notice and would take you to and from your housing community to other locations you need to go, for a low cost (a few dollars for each trip). This service would cover travel between your residence and places you want to go. The ride service could be pre-arranged or you could request a ride at short notice.

The carsharing service was described as follows in the survey:

> One service is to provide vehicles for short-term use (similar to a rental car) that residents could reserve ahead of time for a few hours or a full day at a low cost (less than $1 per hour). These vehicles would be available to any resident in your housing community, and the cost would cover maintenance and cleaning.

Respondents indicated a strong willingness to use the services as described above. Consistent with the findings above, there was less demand for work, higher education, K-12 travel (approximately 25% to 50%) relative to shopping, health care travel, and household errand (approximately 70%). See Table 9.

These results suggest the potential to reduce parking with the implementation of a shared use vehicle program, such as ridesourcing or carsharing. Savings from avoided parking costs could allow for other community needs to be met, including more affordable housing and electric vehicle charging infrastructure.

Table 9. Willingness to use Ridesourcing and Carsharing Services

	Work	Higher Education	K-12 School	Household Errands	Shopping	Healthcare
Ridesourcing						
Less than once a month	7%	4%	6%	10%	9%	15%
About once a month	3%	1%	1%	6%	7%	11%
A few times a month	5%	1%	7%	15%	13%	22%
About once week	3%	1%	3%	8%	10%	6%
A few times a week	6%	7%	7%	12%	19%	7%
Every day	26%	11%	31%	10%	10%	7%
Never/Not Applicable	51%	76%	46%	39%	32%	32%
Number	149	138	149	144	148	150
Carsharing						
Less than once a month	3%	4%	4%	6%	6%	16%
About once a month	5%	0%	1%	6%	7%	10%
A few times a month	1%	1%	3%	11%	8%	24%
About once week	1%	1%	0%	9%	15%	3%
A few times a week	10%	7%	8%	20%	24%	8%
Every day	25%	11%	37%	9%	9%	8%
Never/Not Applicable	55%	77%	47%	39%	32%	31%
Number	150	132	150	148	151	153

Use of carsharing and ridesharing programs, however, typically requires access to a credit card or bank account. Our survey results indicate that about 59% of respondents have a bank account and 42% have a credit card. Carsharing and ridesourcing services typically allow for telephone access to a call center in addition to smartphone access. As indicated above, 47% of respondents stated that they only spoke Spanish. Bilingual telephone operators at a call center would be an important component for a ridesourcing and carsharing service in these communities. Ridesourcing companies (such as Uber and Lyft) allow users to request a Spanish speaking driver.

Age of Household Cars and Vehicle Emissions Reduction Programs

We asked residents the age of the vehicles owned by their households (for up to three vehicles). The results indicated that most vehicles were about 11 to 13 years old; the oldest vehicle was 24 years old, and the newest was a year old. See Table 10 below.

Table 10. Age of Vehicles Owned by Respondent's Household

	Car #1	Car #2	Car #3	Total
Mean	2006	2006	2005	2006
Mode	2002	2003	2005	2004
Minimum	1993	1996	1993	1993
Maximum	2016	2016	2015	2016
Number	107	43	8	158

In addition, we asked residents whether they were aware of two California incentive programs that provide financial incentives to reduce vehicle emissions. See Table 11 below. Sixty percent of respondents indicated that they had not heard of the "Tune In, Tune Up" program that provides residents in the San Joaquin Valley free vehicle smog checks as well as $500 vouchers to repair cars that do not pass smog tests. Seventy percent of respondents indicated that they had not heard of the rebates available to residents in the San Joaquin Valley who purchase new or used vehicles that are either fully electric or hybrid electric vehicles. Some respondents had heard of the programs but not used them: 33% for "Tune In, Tune Up" and 26% for electric vehicle rebates. Very few had used the program: 6% for "Tune In, Tune Up" and 3% for electric vehicle rebates.

Table 11. Awareness of Awareness of Incentive Programs to Reduce Vehicle Emissions

	"Tune In, Tune Up"		**Rebates for Electric Vehicles**	
Respondent Awareness	Count	Percent	Count	Percent
No	85	60%	102	70%
Yes, but have not used	47	33%	38	26%
Yes, have used	9	6%	5	3%
Total	141	100%	145	100%

Conclusions

The following is a summary of the findings and recommendations of this study.

7. Survey respondents successfully marshal their limited transportation resources to travel to activities that are essential to the current or future economic wellbeing of their households. Only 12% of respondents report that they missed work, 6% missed college/continuing education, and 4% missed K-12 school within the last week due to a lack of transportation. However, many indicate that their transportation resources are not sufficient to sustain travel necessary for physical and emotional health. About 20% of respondents indicate that lack of transportation limits their ability to get medical attention, travel to their preferred grocery store, and visit friends and family.

8. Respondents indicate a strong willingness to use ridesourcing and carsharing service located at their affordable housing complex. Stated demand for carsharing and ridesourcing services range from 25% to 50% for work, higher education, and K-12 travel and is about 70% for shopping, health care travel, and household errands.
9. Analysis of the use of respondents' current vehicles and stated willingness to use ridesourcing and carsharing services suggests the potential to reduce parking demand. Respondents indicate that 13% of reported vehicles are never used, 2% are used once a month or less, 6% are used a few times a month, and 5% are used about once a week.
10. Barriers to paying for carsharing and ridesourcing services include lack of credit cards and bank accounts. Only 59% of respondents have a bank account, and 42% have a credit card.
11. Only 53% of respondents speak English and the rest speak Spanish. Carsharing and ridesharing programs in these communities should include a call center staffed with bilingual operators.
12. Survey respondents lack knowledge about public incentive programs aimed at reducing vehicle emissions in the San Joaquin Valley. Sixty percent had not heard of the "Tune In, Tune Up" program and 70% had not heard of the sizable electric vehicle rebates available to them. Targeted outreach and education programs should be expanded to inform affordable housing residents about these programs. Another idea is to provide one-stop shops to enhance access to information and assistance for the multiple programs that low-income community members may be eligible.

There is very little research on the unmet needs of and transportation alternatives for low-income households in California. This research has helped inform the California Air Resources Board's efforts on Senate Bill 350 Clean Energy and Pollution Reduction Act of 2015. It has also helped the eight San Joaquin Valley Metropolitan Transportation Agencies design and plan possible pilot programs for implementation with Low Carbon Transportation Investment funds. Pending available funding, similar surveys at affordable housing complexes should be conducted throughout the State of California.

References

American Community Survey (ACS) 2011 to 2015, Tables DP02, DP03, and DP04, Access July 27, 2017

Center for Neighborhood Technology 2016, AllTransitTM, alltransit.cnt.org, Accessed July 25, 2017.