

**The Hope of New Urbanism:  
Energy Conservation and Sustainability through Urban Design**

Prepared for  
**The John Randolph and Dora Haynes Foundation**

Prepared by  
**University of California at Riverside**  
**Center for Sustainable Suburban Development**  
Dr. Juliann Emmons Allison, Associate Director  
Dr. Jeff McLaughlin, Project Manager and Fellow  
D. Xavier Medina Vidal, Research Assistant

**College of Engineering - Center for Environmental Research and Technology**  
Dr. Matthew Barth, Director  
Dr. Kanok Boriboonsomsin, Assistant Research Faculty

**Survey Research Center**  
Dr. Martin Johnson, Director

August 1, 2010

#

## Summary

New Urbanism, an urban design movement first appearing in the early 1980s, encourages a mix of housing, commercial, and recreational activities within “walkable” communities, often close to mass transit and everyday amenities. This study investigated whether New Urbanist residential design in urban and suburban southern California increases energy efficiency by reducing reliance on individual automobile use, especially the number of miles driven, and commutes, and as well as other transportation and environmental decisions. The project analyzed the commuting behaviors of residents in four communities. In— in West Los Angeles, we compare the behavior and choices of residents of the 3,000-unit Playa Vista development to the nearby neighborhood of Mar Vista, in Riverside County, we compare the 450-home Dos Lagos community in Corona to the adjacent neighborhood of Eagle Glen. Transportation Systems Research Residents in these communities participated in two annual surveys that included questions regarding their housing decisions, the extent to which they use live/work amenities built into their homes, and whether they take advantage of shopping, dining and entertainment available in their community. Residents were also asked about their daily vehicle use and energy/gasoline consumption. Their responses were used as the basis for complex traffic modeling of newer residents in the communities to determine if commuting habits change from move-in through several fixed points in time over a six-month period.

## **Key Findings**

We found suggestive evidence that residents of these New Urbanist communities make different transportation choices from residents of more traditional communities.

- Across the four studies we conducted for this project (2008 and 2009 in two locations), we find that in terms of raw numbers, in three of the four, New Urbanist residents make fewer automobile trips.
- However, the findings are mixed with regard to total travel time and total vehicle miles travelled. New Urbanist residents are not using their vehicles less or travelling fewer miles.
- New Urbanist residents are more likely to walk, bicycle or use public transportation for trips away from home.
- The degree to which New Urbanist residents take advantage of the mixed-use (live/work) attributes of their communities is also promising. Generally, more New Urbanist residents report working from home when compared to their traditional community resident counterparts.
- In the 2009 survey, we find enthusiasm regarding hybrid vehicles among New Urbanist residents. The rates of hybrid car ownership and willingness to purchase or lease one are higher in New Urbanist communities.
- Many of these differences may be attributable to the characteristics of New Urbanist residents as much as they are to community design. New Urbanist families are younger on average, smaller, and own fewer vehicles.

These results suggest potential effects of New Urbanism on driving behavior and consumer choices that could reduce the environmental impact of southern California. However, they

are ultimately inconclusive. More study is needed to unpack the relationships between demographics, housing choices, automobile use and urban design in southern California.

**Research Question**

New Urbanism, an urban design movement first appearing in the early 1980s, encourages a mix of housing, commercial, and recreational activities within “walkable” communities, often close to mass transit and everyday amenities.

Our research assesses the effects of New Urbanism in southern California, focusing on two recent New Urbanist residential developments. We ask how increased access to live/work arrangements, where people reside and work in adjacent property, as well as proximity to primary consumer goods and recreational options, hallmarks of a New Urbanist community reduces the reliance of southern Californians on their cars. The results of the study shed light on how New Urbanism can impact lifestyle choices, particularly commuting, and reduce air pollution.

The State of California faces significant sustainability challenges. In particular, population growth and suburban development immediately affect automobile commuting, traffic congestion, and air pollution. In spite of the ongoing economic crisis, California continues to experience increasing population growth. The Southern California Association of Governments anticipates the addition of approximately 2.1 million new residents to the region by 2014.<sup>1</sup> This population surge will pose new sustainability challenges for California as the state struggles to accommodate new development in light of increasing shortages of resources (power, gas, water, etc.) that has become one of the largest development policy debates in the State.

Population growth is undeniably associated with comparable increases in energy use, including gas to fuel automobiles, and air pollution. Statewide, California consumes approximately 414 gallons of gas per-capita on an annual basis according to 2004 statistics.<sup>2</sup> At the current rate, Californians will consume approximately 20 million more gallons of gas each year with an expanding population base (500,000 additional population times 414 gallons estimated annual consumption) at an additional cost of almost \$50 Million annually above current consumption rates assuming a \$2.40 regular gasoline price. Daily, California spends approximately \$82 Million for gas. In addition, gas consumption adds to the 82% of greenhouse emissions that occur from burning fossil fuels in the U.S.<sup>3</sup> In terms of future consumption, it becomes paramount for California to find new tools to link growth with energy consumption in a way that leads to lasting lifestyle changes that impact fossil fuel consumption for coming generation of Californians.

#####

<sup>1</sup> Johnson, Ma’Ayn. 2009. *Addressing Regional Housing Needs: Overview of the SCAG Methodology, Policy Decisions, and Role in Housing Requirements*. Southern California Association of Governments. [http://www.scag.ca.gov/housing/pdfs/rhna/RHNA\\_LeagueofCities072409.pdf](http://www.scag.ca.gov/housing/pdfs/rhna/RHNA_LeagueofCities072409.pdf)

<sup>2</sup> State of California Energy Commission, U.S. Motor Gasoline Use Per Capita, [http://www.energy.ca.gov/gasoline/statistics/gasoline\\_per\\_capita.html](http://www.energy.ca.gov/gasoline/statistics/gasoline_per_capita.html)

<sup>3</sup> State of California Energy Commission, “Why Should We Care About The Vehicles We Buy And Drive?” <http://www.consumerenergycenter.org/transportation/why.html>

The South Coast Air Quality Management District (SCAQMD) notes that over 75% of the smog problem in Southern California is caused by vehicles and other machines that rely on internal combustion engines. Smog is generated by the approximately 9.5 Million cars in the Southern California region drive approximately 330 million VMT daily (SCAQMD, 2006:1). About 75% of vehicular traffic if drive alone commuting.<sup>4</sup>

Given the pollution problems associated with vehicles, it has become paramount to look at new ways to curb existing traffic as well as plan for changes due to growth in the Southern California region. New Urbanist design promises to reduce automobile use through the provision of basic neighborhood services in compact communities - a departure from the low-density “sprawl” types of development that dominate the Southern California landscape.

### **Research Design**

Our primary measure of automobile use is vehicle miles travelled (VMT). This measures the number of miles a driver covers using his or her automobile in a given time period. We ultimately measure this two ways, by 1) relying on estimates from self-reported vehicle use among survey respondents and, 2) for a subset of these respondents, actual vehicle use measured using sophisticated Global Positioning System (GPS) travel monitors installed in participant vehicles. In order to assess the impact of residential design on VMT, researchers focused on the question of how much commuting behaviors in the Dos Lagos and Playa Vista communities differ in relation to baseline commuting information for the area. Researchers investigated whether the design standards of New Urbanism, which encourage live/work arrangements and the integration of retail and lifestyle amenities that facilitate community and reduce energy dependence, have a measurable impact on daily living that will result in energy savings. They relied on a *dual* research strategy that incorporated both surveys of residents in the Dos Lagos community in Riverside County and the Playa Vista community in Los Angeles, and analysis of these residents’ driving patterns.

### **Results**

#### **Driving Behavior**

We begin to answer the central question motivating this research project, whether commuting behaviors in New Urbanist communities differ from those in traditional urban communities, in Tables 1 and 2 below. There we present summary results from our mail surveys and from the GPS tracking among New Urbanist and non-New Urbanist residents conducted in 2008 and 2009.

*West Los Angeles -- Playa Vista and Mar Vista*

In Table 1 we present summary data of GPS-tracked and self-reported driving behavior in 2008 and 2009 in the communities of Playa Vista and Mar Vista, CA. For 2008, our GPS tracking data on the driving behaviour of New Urbanist residents of Playa Vista reveal that,

#####

<sup>4</sup> Southern California Association of Governments. *State of the Region 2006*. Los Angeles, CA: Southern California Association of Governments.

on average, New Urbanist residents make *fewer* total trips than the non-New Urbanist residents of Mar Vista, yet they spend, on average, 35 percent *more* time in their vehicles in a week (581.7 vs. 376.4 minutes) and cover 1.3 times *more* physical distance (gross VMT) in that time.

An examination of the summary results of the 2008 Lifestyle and Energy Use Survey we confirm New Urbanist (Playa Vista) residents indeed cover (1.4 times) more miles (gross VMT) than non-New Urbanist (Mar Vista) residents. Beyond that, residents of Playa Vista and Mar Vista report making very similar numbers of total weekly driving trips, walking trips, and trips using mass transit. Finally, in 2008, our survey reveals New Urbanist (Playa Vista) residents own, on average, 1.7 vehicles per household compared to an average of 2.0 vehicles.

**Table 1.** GPS-tracked and self-reported trip statistics:  
Playa Vista and Mar Vista (West Los Angeles, CA)

	2008*		2009**	
	<i>Playa Vista</i> Mean (S.D.)	<i>Mar Vista</i> Mean (S.D.)	<i>Playa Vista</i> Mean (S.D.)	<i>Mar Vista</i> Mean (S.D.)
<i>GPS tracking</i>				
Total number of trips	<b>24.5</b> (4.9)	<b>26.4</b> (14.6)	<b>24.0</b> (6.8)	<b>37.5</b> (14.2)
Total travel time (minutes)	<b>581.7</b> (455.3)	<b>376.4</b> (147.7)	<b>368.4</b> (75.4)	<b>536.8</b> (205.4)
Gross vehicle miles travelled (miles)	<b>162.3</b> (136.2)	<b>127.6</b> (58.8)	<b>120.6</b> (50.6)	<b>195.6</b> (92.5)
<i>Self reporting of weekly activity</i>				
Number of driving round trips	<b>11.2</b> (5.1)	<b>11.0</b> (6.3)	<b>10.6</b> (4.6)	<b>12.5</b> (9.8)
Gross vehicle miles travelled (miles)	<b>187.3</b> (210.2)	<b>131.6</b> (137.3)	<b>135.1</b> (194.6)	<b>199.2</b> (471.9)
Number of walking/cycling trips	<b>3.0</b> (4.2)	<b>2.9</b> (3.8)	<b>5.0</b> (4.3)	<b>3.2</b> (6.0)
Number of mass transit trips	<b>.332</b> (2.1)	<b>.221</b> (.885)	<b>2.8</b> (7.8)	<b>.932</b> (4.1)
Number of vehicles	<b>1.7</b> (.657)	<b>2.0</b> (.959)	<b>1.6</b> (.661)	<b>1.7</b> (.820)
Concern for the environment	<b>2.9</b> (.921)	<b>3.2</b> (.937)	<b>2.9</b> (.851)	<b>2.8</b> (1.1)

\*GPS tracking period: October 4, 2008 - October 18, 2008

\*\*GPS tracking period: September 19, 2009 - October 3, 2009

The summary statistics for the 2009 GPS-tracking and 2009 Lifestyle and Energy Use Survey conducted in West Los Angeles reveal something of a different story than in 2008. A side-by-side comparison of New Urbanist Playa Vista and non-New Urbanist Mar Vista in 2009 suggests a more promising picture of New Urbanist planning.

The 2009 GPS tracking data show 1.5 times *fewer* total weekly driving trips in Playa Vista than in Mar Vista, 24 trips and 37.5 trips respectively. This translates also into 1.5 times *less* travel time and 1.6 times *fewer* gross VMT in New Urbanist Playa Vista than in Mar Vista.

Likewise, the summary of self-reported driving activity in 2009 in Playa Vista and Mar Vista reveal that Playa Vista residents report accumulating nearly 1.5 times *fewer* gross VMT than Mar Vista residents and, on average, approximately two more driving trips in a week.

#### *Corona – Dos Lagos and Eagle Glen*

The summary results of 2009 and 2010 GPS tracking and the 2008 and 2009 Lifestyle and Energy Use Surveys conducted in the Corona, CA are presented in Table 2.

The 2010 GPS tracking data for Dos Lagos and Eagle Glen, like West Los Angeles in 2009, provide more encouraging suggestive evidence of New Urbanism's effect on driving behavior. We found residents of the New Urbanist community of Dos Lagos to make *fewer* total driving trips, drive *fewer* miles on those trips, and spend nearly the same number of hours driving in a week as residents of Eagle Glen (24 hours vs. 22 hours).

The self-reporting of driving behavior in Dos Lagos and Eagle Glen in 2008 suggest that the driving habits of New Urbanist residents of Dos Lagos are, on average, not very different from those of their counterparts in Eagle Glen. Yet, when queried on alternatives to driving, Dos Lagos residents report making *more* walking/cycling trips and making *more* use of mass transit. Finally, residents of Dos Lagos report owning *fewer* vehicles than their counterparts in Eagle Glen. The vehicle ownership statistic holds in the 2009 study period as well.

In the Corona area in 2009, GPS tracking data reveal that New Urbanist residents of Dos Lagos made *fewer* trips but accumulated *more* vehicle miles travelled than their counterparts in Eagle Glen. The average amount of time spent on the road by Dos Lagos residents was 1.6 times that of Eagle Glen residents.

The summary data of self-reported number of driving trips and gross VMT in Corona in 2009, which in this case appear to be more reliable than the GPS data due to high standard deviations, reveal that on average Dos Lagos residents made fewer trips *and* drove *fewer* miles in the study period. The New Urbanist Dos Lagos residents and their counterparts report similar numbers of walking/cycling trips and vehicles. Yet, as in 2008, Dos Lagos residents report making more trips using mass transit. In 2009 they report making nearly 4 times as many mass transit trips than Eagle Glen residents.

**Table 2.**

GPS-tracked and self-reported trip statistics:  
Dos Lagos and Eagle Glen (Corona, CA)

	2008/2010*		2009**	
	<i>Dos Lagos</i>	<i>Eagle Glen</i>	<i>Dos Lagos</i>	<i>Eagle Glen</i>
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
<i>GPS tracking*</i>				
Total number of trips	<b>26.1</b> (13.5)	<b>30.2</b> (19.4)	<b>27.5</b> (11.0)	<b>28.8</b> (6.2)
Total travel time (minutes)	<b>1,442.6</b> (899.4)	<b>1,318.7</b> (675.0)	<b>1,746.4</b> (1,401.8)	<b>1,067.0</b> (1,362.1)
Gross vehicle miles travelled (miles)	<b>255.7</b> (19.3)	<b>289.9</b> (35.5)	<b>315.0</b> (182.7)	<b>209.7</b> (6.2)
<i>Self reporting of weekly activity (2008)</i>				
Number of driving round trips	<b>12.9</b> (6.2)	<b>13.2</b> (8.2)	<b>11.0</b> (5.8)	<b>14.2</b> (7.9)
Gross vehicle miles travelled (miles)	<b>311.5</b> (359.2)	<b>335.8</b> (442.6)	<b>264.4</b> (290.6)	<b>294.1</b> (282.4)
Number of walking/cycling trips	<b>2.8</b> (2.9)	<b>1.3</b> (3.0)	<b>2.5</b> (8.4)	<b>2.8</b> (6.7)
Number of mass transit trips	<b>4.2</b> (16.8)	<b>.484</b> (1.8)	<b>4.5</b> (22.4)	<b>1.2</b> (6.3)
Number of vehicles	<b>2.0</b> (.606)	<b>2.8</b> (4.7)	<b>1.8</b> (.489)	<b>2.3</b> (.829)
Concern for the environment	<b>2.8</b> (.902)	<b>2.4</b> (.900)	<b>2.6</b> (.906)	<b>2.4</b> (.992)

\*GPS tracking period: 2010

\*\*GPS tracking period: January 24, 2009 - February 7, 2009

### Concern for the Environment and Hybrid Vehicle Use

Our interest in the differences between the commuting behaviors of New Urbanist residents and non-New Urbanist residents encouraged us to learn more about the profile of a typical resident of a New Urban community. Thus, our research also examines the preferences of New Urban community members with respect to their concern for the environment and hybrid vehicles.

#### *Concern for the Environment*



In the 2008 and 2009 Lifestyle and Energy Use surveys we asked residents of our study communities in West Los Angeles and Corona the extent to which they agreed with the statement: “We worry too much about the environment, and not enough about prices and jobs today”, with the option to strongly agree (1), agree (2), disagree somewhat (3), or strongly disagree (4). Comparing the summary average responses to this question yields somewhat mixed results.

In 2008 in West Los Angeles, the average response among Playa Vista residents (2.9) was slightly lower than that of Mar Vista residents (3.2). That is, the result suggests New Urban Playa Vista residents were slightly *less* concerned with the environment than their counterparts in Mar Vista. However, in 2009 they appeared to be slightly *more* concerned.

Residents of the New Urbanist community of Dos Lagos were slightly *more* concerned with the environment than residents of Eagle Glen in both the 2008 and 2009 Lifestyle and Energy Use surveys.

**Table 3.** Concern for the Environment

	West Los Angeles		Corona	
	<i>Playa Vista</i> Mean (S.D.)	<i>Mar Vista</i> Mean (S.D.)	<i>Dos Lagos</i> Mean (S.D.)	<i>Eagle Glen</i> Mean (S.D.)
<b>2008</b>				
Concern for the environment	<b>2.9</b> (.921)	<b>3.2</b> (.937)	<b>2.8</b> (.902)	<b>2.4</b> (.900)
<b>2009</b>				
Concern for the environment	<b>2.9</b> (.851)	<b>2.8</b> (1.1)	<b>2.6</b> (.906)	<b>2.4</b> (.992)

### *Hybrid Vehicles*

In the continued effort to build on our understanding of individuals who choose to live in New Urbanist communities, we added questions concerning hybrid vehicles to the 2009 Lifestyle and Energy Use Survey administered in West Los Angeles and Corona. The summary of responses to the battery of three questions about hybrid vehicles is presented in Table 4.

The frequencies and percentages presented in each cell in Table 4 represent the number and percentage of *positive responses* to each question for each subgroup. For example, of all survey respondents from Playa Vista, six (13.6 percent) report owning a hybrid vehicle in 2009.

Overall we find both New Urbanist residents and non-New Urbanist residents to be enthusiastic about hybrid cars. In particular, we find that New Urbanist residents, in both Playa Vista and Dos Lagos, own more hybrid vehicles, and are more open to owning one. This openness to buying or leasing a hybrid even when the hybrid would cost more, the New Urbanist residents of Playa Vista are slightly less enthusiastic than their counterparts in

Mar Vista about their commitment to owning a hybrid vehicle. These findings are consistent with the expectations we have about New Urbanists’ values and beliefs regarding the state of the environment and their impact on reducing environmental contamination.

**Table 4.** Opinion on Hybrid Vehicles  
(2009)

	West Los Angeles, CA		Corona, CA	
	<i>Playa Vista</i> Frequency (%)	<i>Mar Vista</i> Frequency (%)	<i>Dos Lagos</i> Frequency (%)	<i>Eagle Glen</i> Frequency (%)
Currently own a hybrid vehicle	<b>6</b> <b>(13.6)</b>	<b>7</b> <b>(9.5)</b>	<b>5</b> <b>(7.9)</b>	<b>5</b> <b>(5.1)</b>
Would seriously consider purchase/lease of hybrid vehicle	<b>35</b> <b>(81.4)</b>	<b>57</b> <b>(78.1)</b>	<b>51</b> <b>(82.3)</b>	<b>68</b> <b>(70.1)</b>
Would still consider under the condition that the hybrid vehicle is more expensive	<b>24</b> <b>(61.5)</b>	<b>41</b> <b>(67.2)</b>	<b>28</b> <b>(51.6)</b>	<b>27</b> <b>(36.0)</b>

### Living and Working in New Urban Communities

#### *Workspace choices*

Residents’ use of live/work spaces incorporated into the Playa Vista and Dos Lagos communities is another issue addressed in our survey. According to our survey respondents, proximity to work and home price are the most important reasons for moving to their current residence. In 2008 and 2009 the importance of living close to the workplace for Playa Vista residents slightly edged out and tied home price as the strongest reason for moving into their current homes. The rank ordering among residents of Mar Vista in 2008 is consistent with that of Playa Vista residents but in 2009 Mar Vista residents ranked home price as a stronger reason for living in Mar Vista.

For 2008 and 2009 residents of the Corona, CA area communities – the New Urbanist Dos Lagos and control community of Eagle Glen – proximity to the workplace was not as important as either “house floor plan” and “house price” to determining why they moved to their current home. In the non-New Urbanist community of Eagle Glen, house price was more than twice as important as proximity to work. This finding lends some support to the argument that the attraction of live/work spaces and close proximity to work is a positive attribute of New Urbanist communities and one that plays out in New Urbanist residents’ preferences and behavior.

*Age, Family, Working from home*

In Table 5 we present demographic data along with the data on working from home. When comparing the general age and family size profiles of New Urban communities to those of their counterparts, the general trend is that residents in New Urban communities are *younger* and have *smaller families*. Playa Vista and Mar Vista residents in 2008 reported working from home at similar rates of 31 percent and 34 percent respectively. In 2009, working from home was much more common among New Urbanist Playa Vista residents, 58 percent of whom reported working from home, compared to the 35 percent of Mar Vista residents who worked from home. Thus, it appears as though Playa Vista residents are increasingly taking advantage of the availability of combined live/work spaces in their New Urbanist community.

Twenty-four percent of Dos Lagos resident respondents in 2008 reported working from home; this is slightly less than the 27 percent of Eagle Glen residents reporting working from home that year. Yet, in 2009 Dos Lagos and Eagle Glen residents reported working from home at rates of 35 percent and 20 percent respectively. Again, while our data do not allow us to pinpoint the availability of live/work spaces in the New Urbanist community of Dos Lagos as the reason for such a disparity in working from home in 2009, it is reasonable for us to suspect this to be playing a role here.

**Table 5.**

Characteristics of New Urban Communities

	West Los Angeles		Corona	
	<i>Playa Vista</i> Mean (S.D.)	<i>Mar Vista</i> Mean (S.D.)	<i>Dos Lagos</i> Mean (S.D.)	<i>Eagle Glen</i> Mean (S.D.)
<b>2008</b>				
Respondent's age	43.6 (14.7)	53.4 (13.8)	44.6 (12.6)	49.7 (12.9)
Family Size	2.0 (.83)	2.8 (1.7)	2.6 (1.4)	3.9 (1.4)
Respondents who work from home (%)	30 (31 %)	37 (34 %)	15 (24 %)	25 (27 %)
<b>2009</b>				
Respondent's age	43.9 (13.1)	52.3 (12.4)	41.8 (14.5)	47.5 (10.8)
Family Size	2.7 (1.7)	3.2 (1.6)	3.1 (1.5)	3.9 (1.5)
Respondents who work from home (%)	25 (58 %)	25 (35 %)	22 (35 %)	20 (20 %)

## **Conclusions:**

In short, the potential effects of New Urbanism on driving behavior and consumer choices could reduce our environmental impact on Southern California. Our study provides suggestive evidence that residents of these New Urbanist communities make different transportation choices from residents of more traditional communities. New Urbanist residents tend to drive less often, and travel fewer miles. This may be related to their career and work place choices (New Urbanist residents report working from home more often than their counterparts) and/or their environmental knowledge and interests (New Urbanist residents appear to be enthusiastic about hybrid cars). It is also possible that residents of the New Urbanist communities we studied are simply younger than the residents of the matched communities we studied. In any case, more study is needed to unpack the relationships between demographics, housing choices, automobile use and urban design in Southern California.