2012 Student Ecological Footprint

ACTION RESEARCH TEAM

Team Co-Leaders:

Clifford Shum, Enid Zhou

Team Members:

Kristelle Batucal, Kim Bowen, Ben Hamaji, Olivia Jenkins

Lead Stakeholders:

Robert Gilbert*, Housing and Hospitality Services Sustainability Coordinator*

Rebecca Miller*, Housing and Hospitality Services Sustainability Analyst*

Table of Contents

Executive Summary

The focus of this research was a continuation of the previous year's action research team, Off-Campus vs. On-Campus. Although this year's Student Ecological Footprint team tackled the same issue as last year's Off-Campus vs. On-Campus team, we used their research and recommendations to narrow our scope, streamline their pre-existing survey, and improve confidence in their initial findings. Instead of surveying both on-campus and off-campus undergraduate students, our team decided to solely focus on off-campus residents. We compiled a brief, fifteen minute online survey, asking off-campus students questions pertaining to their general energy consumption habits including modes of transportation, recycling, composting, as well as electricity and gas bill data from three consecutive billing cycles. Our goal was to determine if there is a correlation between a student's ecological footprint and their residence type. We exceeded the number of off-campus participants from the year prior and have managed to collect billing info from a majority of them. Through our calculations, we were able to conclude from our sample that on-campus students use roughly 1.25 times more kWh per day on average than off-campus students. In contrast, our data suggests that off-campus students use approximately 2.4 times more therms of gas per day on average than on-campus students. However, total carbon emissions per individual were higher for off-campus residents. Minor trends in convenience and altruism that affected individual energy use were noted. Our recommendations are to make carbon emission comparisons between on-campus and off-campus energy use with respect to energy sources, expand and randomize sample populations further, and to quantify possible on-campus carbon offsets such as composting and recycling programs. We hope that these findings can assist future action research teams as well as UCLA Housing & Hospitality in making informed sustainable changes to the University's residential community.

Overview

The basis of our project came from UCLA's Climate Action Plan (CAP) of 2008, which is our campus-wide goal of reducing our greenhouse gas emissions to 1990 levels by 2020, and zero emissions as soon as possible. It was therefore important for UCLA's Housing and Hospitality Services (H&HS) to determine the average carbon footprint of each student so that they can better formulate management options or introduce educational outreach opportunities for students living within the university's residential community, known colloquially as "the Hill". Our Student Ecological Footprint Team was a continuation from last year's On-Campus vs. Off-Campus Action Research Team (ART). Using last year's model as a basis for our research, our team aimed to evaluate off-campus undergraduate student carbon emissions through electricity and gas usage measurements through the use of self-reported surveys. Our intention was to find a relationship between the type of residency (on or off-campus) and the size of a student's carbon footprint so that we can endorse a plan of action for UCLA H&HS to help attain the University's formidable goals.

Our research used quantitative data from three billing cycles to discover trends in off-campus students' personal energy consumption habits and conduct comparisons of their energy-use to those of students living on campus. Another initial goal of our project was to implement a separate educational outreach component that was aimed towards students living off campus. The basis behind the concept was an accessible guide designed for off-campus residents so that students with an interest in reducing their personal carbon footprint could find relevant tips. We had hoped to create a sustainable-living web resource that partnered with the UCLA H&HS website, but due to time and skill limitations, we were unable to complete this part of our project.

Significance and Background

The significance of this research was to determine if there is any substantial difference in a student's ecological footprint from living in an off-campus private apartment or home, compared to living in one of the university's residence buildings. Existing bodies of research such as CAP (2008) and Student Master Housing Plan (2007) should benefit from a well-defined carbon footprint-based comparison between students living on and off campus. Current and planned housing developments on "the Hill" intend to incorporate thousands of additional beds to accommodate increasing freshman and out-of-state admissions through 2020. This results in a greater carbon footprint for the entire campus, as the construction of four new residential buildings will undoubtedly augment the amount of current electricity, gas, and water usage, while increasing the amount of waste generated. However, "the Hill" offers composting availability, energy-efficient appliances, and more-sustainable energy sources, which could possibly generate less carbon emissions in comparison to the off-campus population. By determining carbon emissions of the off-campus student population, it can be ascertained whether or not UCLA's carbon impact to the greater community is reduced if more students are given room and board. If it is discovered that this is the case, these general findings can attest that UCLA's residential buildings are a carbon offset for the outlying community, pushing the campus closer to its goal of carbon neutrality. We hope that UCLA H&HS can integrate our findings with current knowledge when deciding upon best management practices for current and future housing initiatives. It would be beneficial for future ESLP action research teams to build upon our findings from the last two years in the interest of increasing confidence in the results found.

Initial Conditions

As a continuation of the previous year's team, many of the components of our project were already at our disposal. With a full cycle of survey distribution and data analysis already conducted last year, it was helpful to have a baseline to scrutinize and see what was effective and where inadequacies were present. More specifically, the previous year's survey provided us with a pool of questions to ask off-campus residents. From this, we were able to accurately gauge the type of responses to expect so that we could mold our survey to generate relevant data. Often there are many metrics that would be useful to fulfill research objectives, but it is extremely challenging to word questions to measure the data exactly as desired. Therefore, it was crucial that last year's team recognized some of these cruxes of survey design so that we were better able to use our time effectively and efficiently. The first couple of weeks we were able to streamline the survey and reduce the length from 25 minutes down to 15 minutes, without compromising our most important metrics. Additionally, the survey flow was already set up in the survey web service, Qualtrics, so no time was lost trying to gain funding for a survey distribution method. From these initial circumstances, our team was able to establish effective patterns of research moving forward.

In terms of creating an off-campus green living guide for students, there was no initial precedent in this educational project. By reviewing the Housing Sustainability website and recognizing the material was written with the on-campus student in mind, it provided an impetus for the creation of our guide. However, due to time constraints this project is still in its development phase where most of the research has been found, but has not been incorporated into a working guide for off-campus students.

Research Methodology

The initial design of our survey was a continuation of the design from the previous year's ART. Almost all of the survey questions utilized were created by last year's team. The survey is split up into three sections, with the first part including living behavior questions, the next part consisting of energy-usage data, and a final altruism index section (Appendix D). The survey was hosted online through Qualtrics, and we distributed our survey link using over twenty departmental mailing lists, using the social media website Facebook, and posting flyers around campus (Appendix C).

This year's team was focused on ensuring the survey was as efficient and streamlined as possible. We knew that a long, verbose, and time-intensive survey would be off-putting to potential participants. We believed that a streamlined survey would help us maximize our distribution and number of responses. With that in mind, the group took a comprehensive look at the survey from last year and narrowed our focus and scope. For instance, some questions that were initially included were too broad, confusing, or wordy, and were eliminated or revised. Additionally, we decided to only include electricity and gas metrics, as these were the metrics deemed most easily calculable and important by our stakeholders. Originally our survey included water-usage data, but this was removed because of the complexity of data calculations and because UCLA H&HS would not have been able to provide us with comparable numbers from on-campus residents.

Our team also spent a significant amount of time figuring out ways to make the survey as user-friendly as possible. One of the biggest concerns was that the gas and electricity data entry sections were too confusing because of the format of the billing cycles. Additionally, we were aware that we might be asking participants about unfamiliar figures or terms from their bills. Our

team was able to resolve these issues by reformatting the structure of this section, while also rewording the terms and explanations. Updated links to energy provider's websites were also included that explain various energy metrics and show where to find certain metrics on the corresponding utility bill. Lastly, the addition of a progress bar at the bottom of each page provided survey participants with an idea of the survey length and served to make the survey less intimidating.

The altruism index section consists of fifteen statements that assess the degree of environmental concern or awareness of each individual and also of the entire UCLA off-campus student population (Appendix D). This section, which is now one of the most important parts of our survey, was almost excluded from our final survey since we initially believed that the altruism index was not specific enough to provide any substantial conclusions. Our group was also hesitant to bog down the project with an excess of questions. This decision was only temporary, as our team realized that the index would allow us to analyze our quantitative data in an insightful and meaningful way. For instance, a participant with a high altruism index score (meaning a high environmental awareness or consciousness) who also has lower energy-usage data than another comparable individual may allow us to conclude that environmental awareness is an important indicator of energy use. Therefore, while we would have been able to analyze the quantitative data without such an index, we would not have had the benefit of the additional level of perspective that such an index provides.

In terms of incentives for participating in the survey, our team discussed several different options. Since last year's team offered each of its off-campus participants a $10 ASUCLA gift card, we wanted to continue to offer a popular, low-cost, and guaranteed incentive to each participant. Through Dart funding, a grant awarded to the Institute of the Environment to fund

the ART program from the Dart Container Corporation, we were able to obtain these incentive prizes for our survey participants. Through this funding, we were able to purchase $1,000 worth of gift cards for all of our survey participants. Other than the cost of the gift cards, our research did not incur any additional cost. While we discussed the possibility of conducting a raffle for a high-cost prize, we ultimately turned away from this design because we felt people would rather have something guaranteed, even if lower in value, than an uncertain prize of higher-value.

Data

Our energy survey yielded 100 responses from off-campus undergraduate students through convenience sampling. The sample population consists of a majority living in off-campus apartments (86%) while a smaller percentage live in private homes (14%). A majority of survey respondents listed their residence in the North of Wilshire area, but our sample included residences in the South of Wilshire area. Nine private homes outside of the immediate Westwood vicinity were included in our sample. The average number of residents per household was 3.93, with household in our case referring to an individual apartment unit or private home. A total of 509 individuals were represented by our sample. Taking into account convenience sampling and small sample size, we believe this to be a fair representation of the current off-campus undergraduate population.

Transportation

In terms of transportation to the campus, a majority of the survey participants preferred walking/skateboarding as their main form of transportation, with public transit being the second highest preference. For our survey, 64% of respondents chose walking/skateboarding as their

primary mode of transportation (Figure 1). Distribution from last year's data on this question obtained a similar majority, with 73% of off-campus students from last year's survey also choosing to walk/skateboard. For our survey, the second most popular choice was public transportation, yielding 18% of responses. Driving was the most preferred form of transportation for people living in private homes, whereas walking/skateboarding and public transit proved to be the popular choice for those living closer to campus. As mentioned in last year's data, the close proximity to campus contributes to this transportation preference.

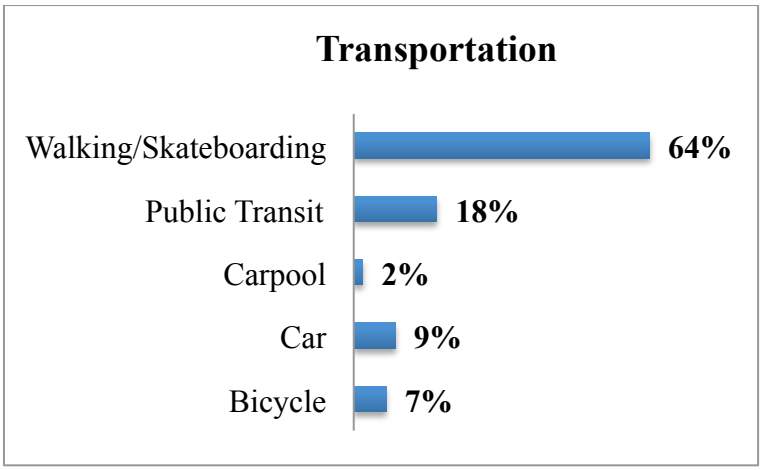


Figure 1. Percentages of respondents indicating their preferred mode of transportation.

When calculating distance of home to campus, we determined the location or cross street of the unit to Bruin Plaza. Off-campus survey respondents were found to live an average of 14.86 miles away. Of our survey participants who live less than a mile away from campus, averaging 0.575 miles, walking/skateboarding is the most popular mode of transportation. All of the students living in private homes that indicated walking/skateboarding as their primary mode of transportation happen to be residents of Hilgard Avenue, the neighborhood opposite of the North Village residential area. Respondents indicating they drove to campus live an average of 19.27

miles away from campus. Moreover, survey takers who opt for public transportation live an average of 24.25 miles away from campus.

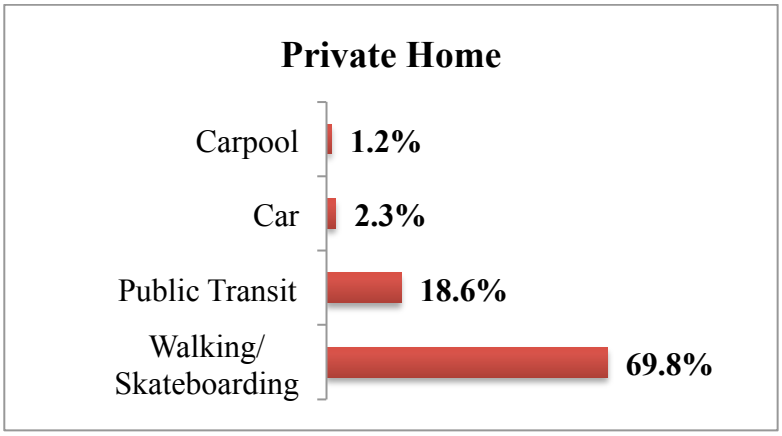


Figure 2. Percentages of preferred modes of transportation for students living in a private home.

Students residing in apartments live 1.3 miles away from campus on average. People who choose to skateboard or walk to school live an average of 1.27 miles away from campus while people who choose public transit live 2.06 miles away. People who biked to and from campus live an average of 1.89 miles away, while people who drove live 3.25 miles away on average. 70% of people who lived in apartments indicated that they chose to walk or skateboard to campus. Moreover, public transportation is the second most popular option yielding 19% of apartment survey takers (Figure 3). These results seem to be accurate, since a majority of our sample lives within a mile from the center of campus.

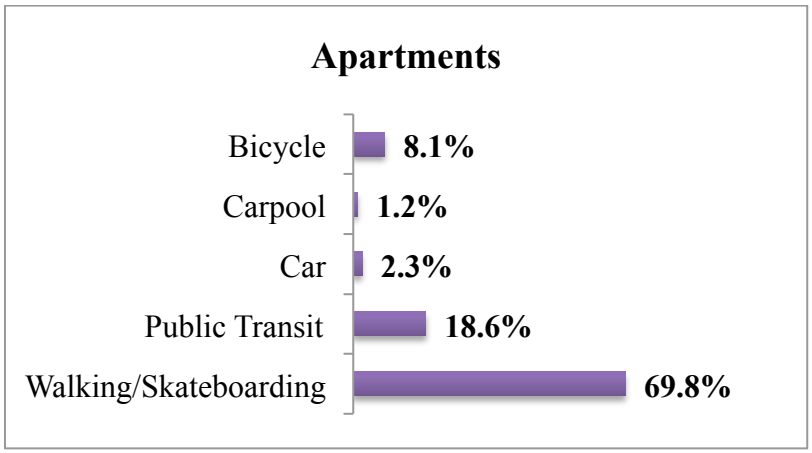


Figure 3. Percentages of preferred modes of transportation for students living in an apartment.

Recycling & Composting

In response to the question about actively recycling, a majority of students answered "Yes" and "Somewhat consistently." 73% of our survey participants had access to a recycling bin provided by the apartment building/private home (Figure 5). Correspondingly, there are relatively high recycling rates within the off-campus student population (Figure 4).

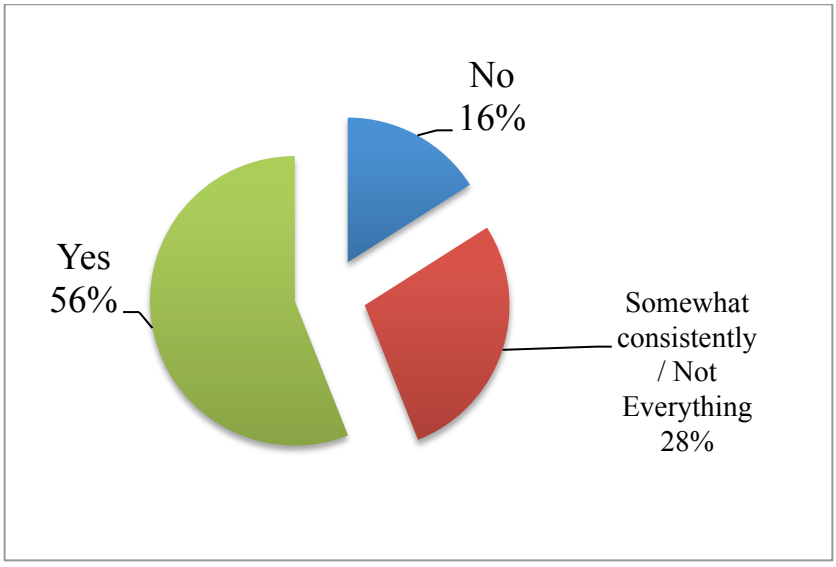


Figure 4. Percentage of survey participants that recycle in off-campus residences.

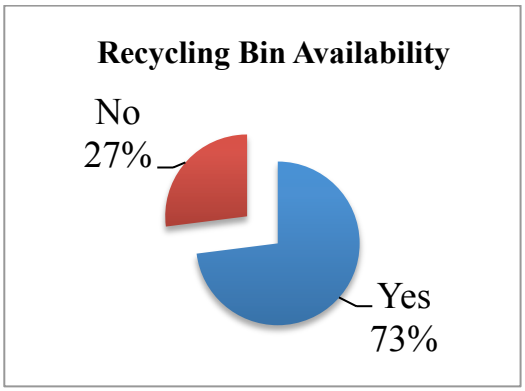


Figure 5. Percentage of off-campus residences that provide recycling bins.

While more than half of survey participants had access to recycling bins, 87% of the survey participants reported that their apartment building/housing did not provide compost or green-waste bins. As a result, 92% of survey takers responded "No" when asking if they actively collect compost (Figure 6).

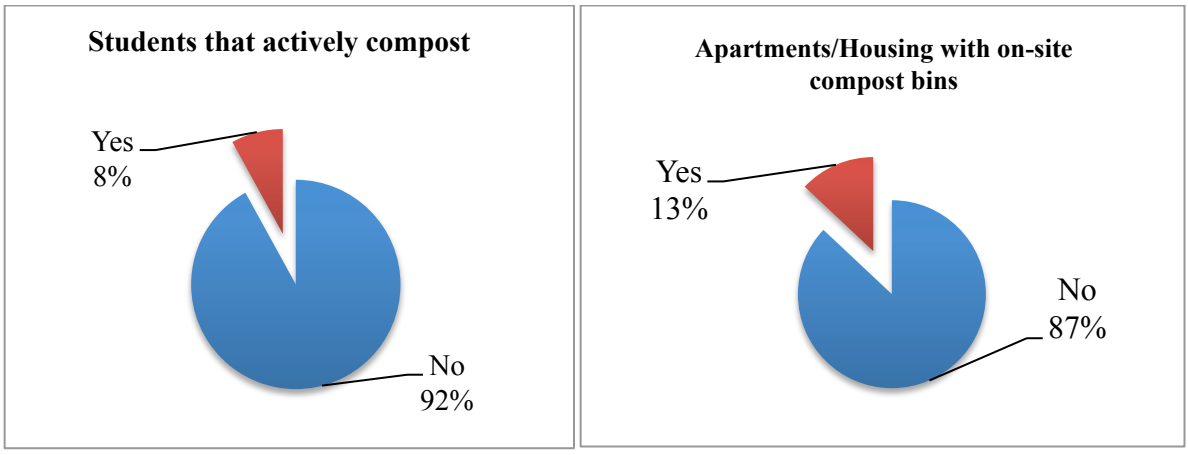


Figure 6. Percentage of off-campus students that actively compost compared to composting/green waste receptacle availability.

This data seems to demonstrate that the accessibility of a recycling bin and a compost bin encourage the opportunity to recycle and compost. For example, when asked how likely to compost if residences have a composting program, 54% answered "Likely" and 36% answered

"Possibly" rather than "No" (Figure 8). In another case, when asked how likely they would be to change light bulbs to CFL bulbs if the bulbs were provided to them, 75% answered "Likely" and 19% answered "Possibly" (Figure 7).

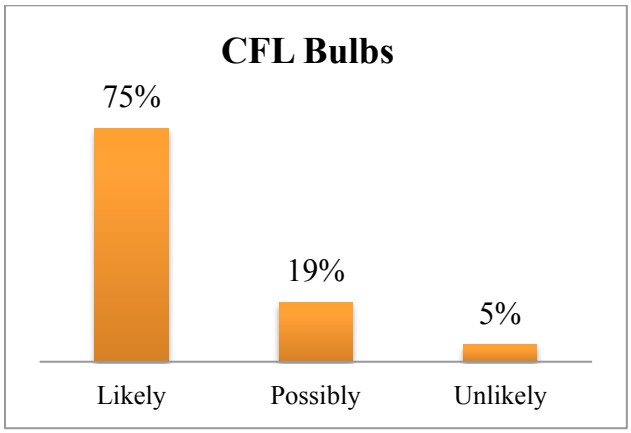


Figure 7. Percentage likelihood of respondents using CFL bulbs, if they were provided.

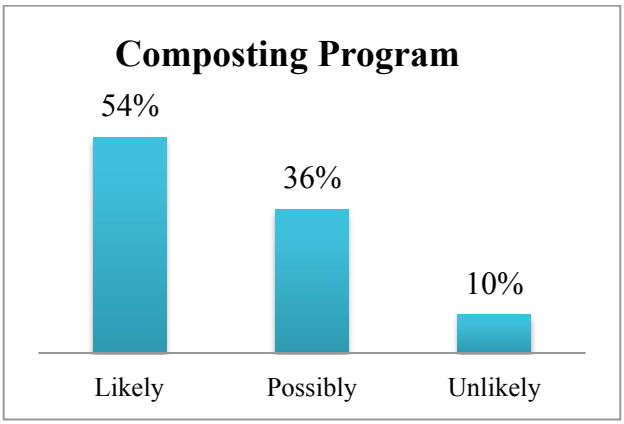


Figure 8. Percentage likelihood of respondents composting if a composting program was available.

Billing

Units of comparison for our analysis include standard kWh for electricity and therms (100 cubic feet) for gas. A majority of the energy data was collected over three billing cycles spanning from the months of October 2011 to March 2012, but billing cycles as early as March 2011 and as late as May 2012 were also included. Month to month comparisons between on-

campus and off-campus residents were desired but difficult to make because of the variations in meter reading days and bi-monthly billing cycles employed by Los Angeles Department of Water and Power (LADWP) and Southern California Edison (SCE).

It was hypothesized by last year's group that the reason for lower off-campus energy use could be attributed to knowing exactly how much energy is personally used and how much your bill costs. Our team was also interested in examining this trend, and our results indicated that this appears to be the case. However, compared to last year's data on monetary costs influencing consumption habits, the percentage allocation for each response changed. This sentiment has declined from the previous year, with 72% of last year's participants noting that they use less energy so that they could lower their utility bill costs dropping down to 48% in this year's survey (Figure 9). Moreover, last year's majority response for "somewhat" and "environmental reasons" is lower compared to this year's data.

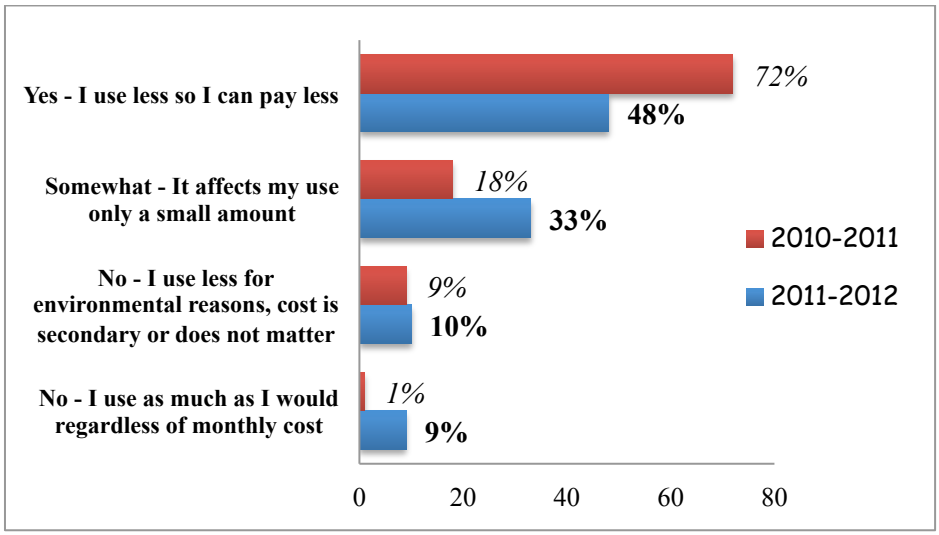


Figure 9. Comparison in percentages of survey responses from last year to this year in regards to the question, "Does having to pay your utility bills separately from your rent influence your use of utilities?"

Gas

Comparisons of gas usage seem to indicate that off-campus students used a substantially higher amount of gas during our sampling period. For the three billing cycles, the average number of therms per household per day was 0.98, which was calculated by dividing the total number of therms per day by the total number of 100 survey responses, assuming that each response represented an individual household. Using an extrapolated value of 393 total individuals from the 3.93 average number of residents per household, the therms per household per day value for the three billing-cycle period was divided by this number to get the number of therms per day per person. Our data indicated that off-campus students used 0.25 therms per day per person. Therefore, off-campus students use roughly 7.5 therms per month per person. In comparison, on-campus students use about half of this amount per month on average (Figure 10, Appendix A).

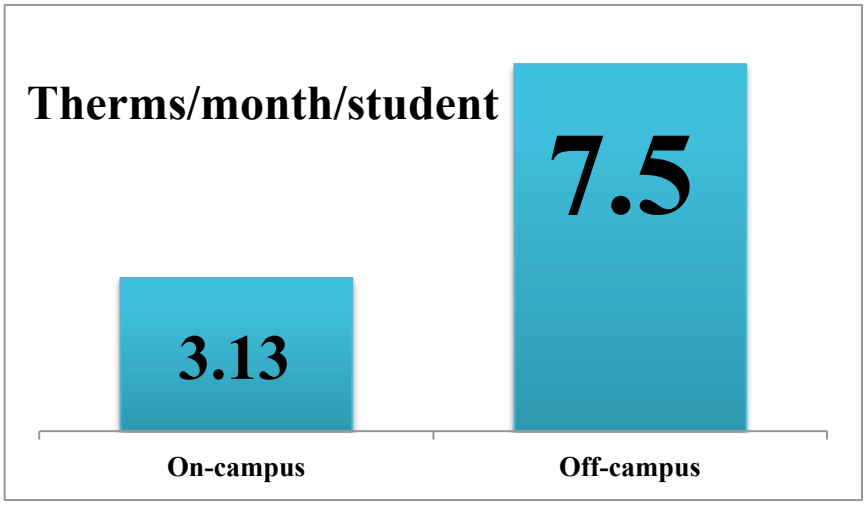


Figure 10. Comparisons of therm usage per month per person.

Ultimately, what is most intriguing is not what was put in, but what was left out. The extremely high level of non-responses for the gas usage section could be that a majority of the

respondents did not have access to their information, did not feel compelled to track down the information, or did not pay their gas bill directly (cost is included with the monthly rent). Each of these scenarios suggests a similar conclusion, which is that a large percentage of people living off-campus is not aware of the amount of gas they use. The significance of this could be that the cost does not affect their use because they are unaware of their amount of usage/ cost of the bill, similar to on-campus residents. For this reason, altruism index scores were not regressed against gas usage because we did not anticipate our findings to be meaningful.

Possible reasons for the disparity in gas usage could be due to the differences in availability of gas-powered appliances. For instance, almost every off-campus residence has some gas-powered appliance, whether it be a stove, oven, or heater. In contrast, most rooms in the on-campus residence halls do not have gas-powered appliances, but rather their gas-usage comes from secondary uses, such as from the dining halls.

Electricity

Our data yielded total kWh of electricity used per household per day of approximately 18.3 kWh. This value was calculated by dividing the total number of kWh per day of all the respondents by the total number of 100 survey responses, again assuming that each response represented an individual household. In terms of the kWh per day per person, the kWh per household per day value was divided by the extrapolated value of 393 total individuals. The total kWh used per day per person was found to be approximately 4.68 kWh. The results indicate that the off-campus residents individually tend to use less energy than on-campus residents, who used 5.85 kWh per day per person (Figure 11, Appendix A). However, this may not be completely accurate because the survey's sample size of 100 students is small in comparison to the 10,000+

students accounted for in the on-campus electricity data. Also, it is possible that the residents who completed the survey were more energy-conscious than their peers who decided not to take the survey. No bias exists for the on-campus data because it was not voluntary input of data but rather numbers directly metered by UCLA H&HS.

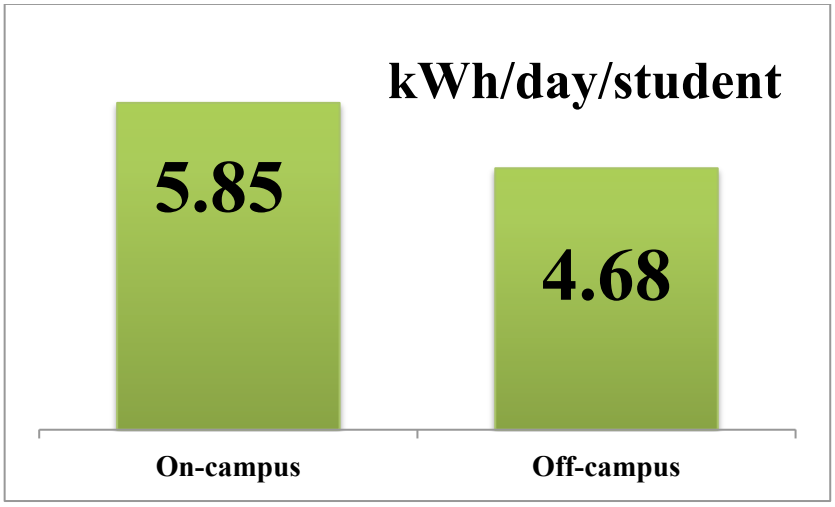


Figure 11. Comparison of kWh usage per day per person.

We predicted that the off-campus students who received a higher altruistic score were more aware of their energy usage and therefore used less electricity. It is entirely possible that some students did not answer the questions completely honestly, since their actual efforts to reduce their carbon footprint did not match their answers. Generally though, the negative correlation between total kWh and altruism score, as illustrated in Figure 12, shows that as the altruism index increased, total kWh decreased. Although our lowest environmental altruistic scores did have the most amounts of kWh usage, some high altruistic scores also corresponded with a higher amount of total kWh use. Thus, this reveals that more environmentally altruistic individuals do not necessarily use less energy, as evident by our low R^2 value of 0.08 (Figure 12).

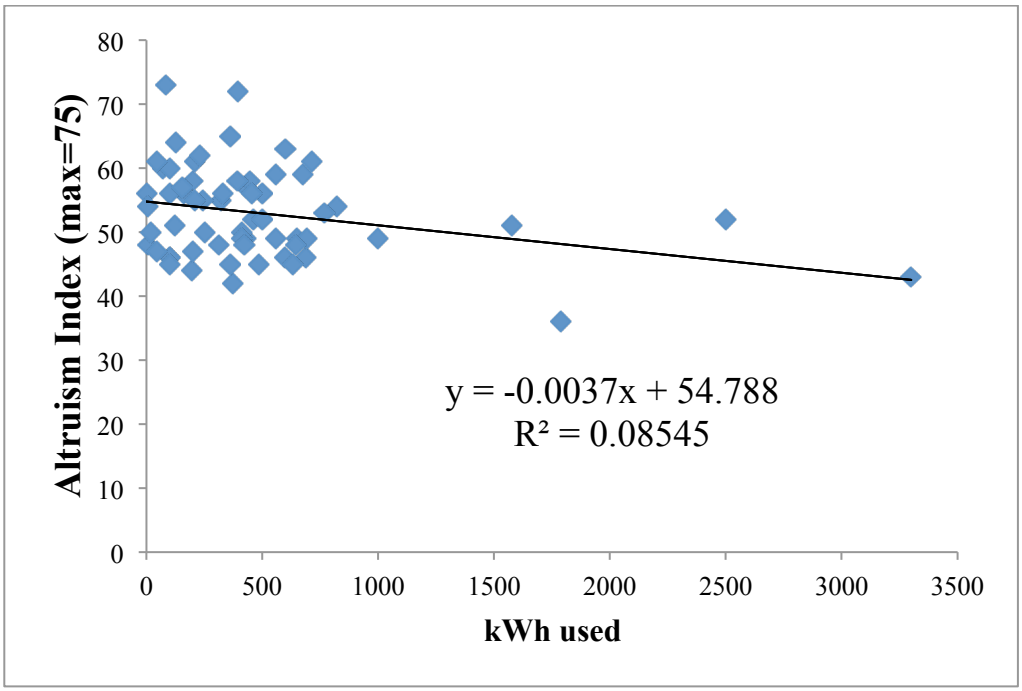


Figure 12. Altruism Index score vs. Total kWh usage.

After accumulating all the energy data from off-campus and on-campus residences, it was important to research the different sources of energy that ultimately serve the UCLA campus and the outlying Westwood community. Energy sources are important for the implications of our findings because kWh used from completely renewable sources have a much reduced carbon footprint. The vast majority of survey takers listed their electricity provider as Los Angeles Department of Water and Power (LADWP), while a small number of students, indicated Southern California Edison (SCE) as their electricity provider. As seen in Figure 13a, SCE generates 37% of its power from natural gas, 19% from nuclear, and 18% from renewables. The remaining percent is split between coal and large hydroelectric sources. Of the renewable power that SCE generates for approximately 364,000 homes for a year, the greatest percentages are geothermal and wind (Figure 13b). Because SCE delivers a large amount of renewable energy to

customers, it does not rely heavily on coal or other sources that contribute to air pollution after combustion. Coal-fired power-plants release sulfur dioxide, nitrogen oxides, particulate matter, and heavy metals, creating smog that affects public health and acid rain.

The most widely used electricity provider for off-campus students was LADWP, whose main energy source is coal (Figure 14a). While coal is 39% of its total energy resources, natural gas and renewable sources together constitute 44% of the energy provided to customers. Although SCE is significantly less dependent on coal, LADWP also utilizes a considerable amount of energy sources associated with increased sustainability.

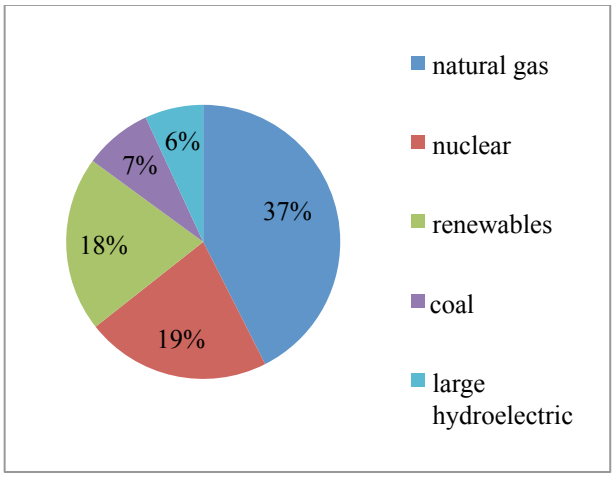


Figure 13a. SCE Energy Source Usage

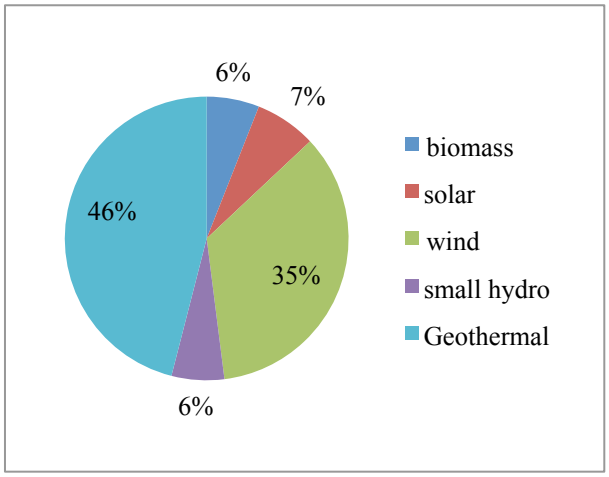
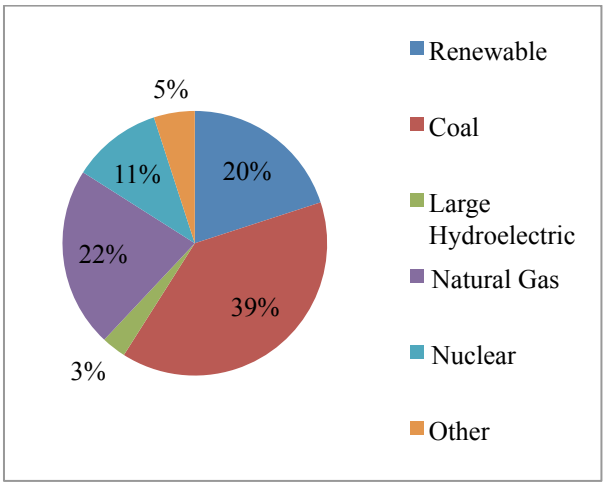


Figure 13b. SCE Renewable Energy Usage



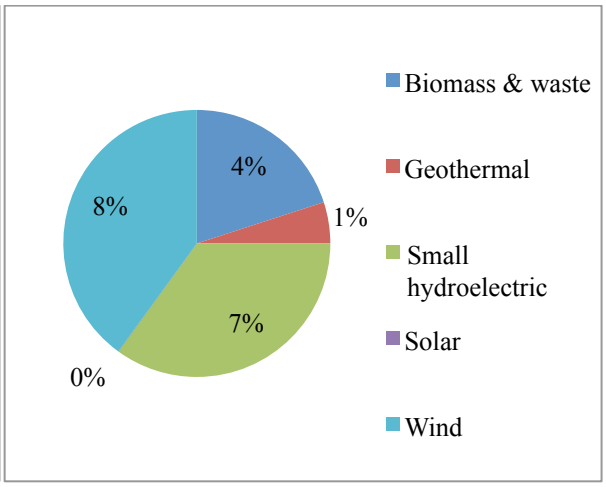


Figure 14a. LADWP Energy Source Usage

Figure 14b. LADWP Renewable Energy Usage

On-campus sources of electricity differ from off-campus in that 70% is from the cogeneration plant on campus. The plant runs on 100% natural gas, of which about 7% is landfill gas. The remaining 30% comes from LADWP, which has the same blend as described above and shown in Figures 14a and 14b. Thus, on-campus housing generates electricity using approximately 40% more natural gas than off-campus housing, which gets its energy primarily from LADWP. As the cleanest fossil fuel, natural gas emits fewer harmful pollutants than other fossil fuels like coal and can reduce the carbon footprint of an entity. Still, LADWP derives 20% of its energy from renewables, so the size difference between the carbon footprint of off-campus residences and on-campus sources is not immense. This preliminary energy source research was important for analyzing our data as a means of estimating a comparison of on-campus renewable energy sources to off-campus energy sources. Due to time limitations, we were unable to conduct a complete energy source comparison between on-campus and off-campus metrics.

Key Findings

One of the principal findings that can be drawn from our research is that differences in energy usage can be observed between the off-campus and on-campus student populations. Some of the results coincided with some of our initial predictions, while others did not. Off-campus students used 2.4 times more therms of gas per day on average than on-campus students. Contrastingly, on-campus residents used roughly 1.25 times more kWh per day on average than off-campus students. When factoring both kWh and therms used per person, we calculated that on-campus residents emit a slightly smaller amount of carbon emissions than off-campus residents at 1,608 lbs. CO_2 per year compared to 2,092 lbs. CO_2 per year (PG&E). Furthermore, in terms of transportation, the distance a resident lives from campus was shown to determine their preferred mode of transportation, with students living less than a mile away from campus choosing walking/skateboarding as their primary mode of transportation. In addition, off-campus survey participants noted that they would compost if they were given the opportunities to compost, as well as adopt CFL bulb lighting if given the opportunity to install it. Ultimately, it appears from our data that living on-campus can reduce per-student carbon emissions by 20%.

Recommendations

Even though we believe that our scope has narrowed immensely in comparison to the start of this research, we suggest that if this team continues next year, further efforts should be put into expanding and randomizing their sample population. While we more than doubled our responses for off-campus undergraduates compared to last year's response rate, we believe that greater accuracy can be achieved. Also, to increase this sample population we recommend putting further emphasis into contacting individual major departments and utilizing the mailing

lists to gather a greater, randomized sample. A sampling technique such as stratified sampling could also be much more indicative of the target population than the convenience sampling used in the last two years. Our team also recognized that participating in tabling events, such as Earth Day Fair tabling, was particularly successful at gathering more survey responses because we were able to talk to people face to face and explain our research.

While we began the preliminary research on comparing energy sources from different energy providers for both off-campus and on-campus uses, we suggest that future teams focus more on these findings and expand on them. The type of energy source can variably factor into an individual's overall carbon footprint. In addition, future teams should also consider the various Housing initiatives currently implemented on "the Hill" and quantify these programs to determine if there is an offset in the amount of energy used for each resident. Programs such as composting and materials recycling, if quantified, can potentially diminish the amount of energy used for the average on-campus resident. Also, since our survey focused solely on off-campus students, we only used two metrics to compare off-campus and on-campus student carbon emissions, kWh and therms. Determining how much of the off-campus population commutes, as well as the average distance they need to travel to campus can greatly influence the amount of per-student emissions. Examining these items more in-depth could be a valuable progression in terms of this research, and could also create a more accurate comparison.

Moreover, in order to comply with UCLA's ambitious goals of decreased environmental impact, we would recommend that UCLA H&HS use our findings to improve resources for off-campus students to reduce their ecological footprint, particularly in the areas of water consumption, energy usage, and resource management. Housing currently does an excellent job of this on the "the Hill" by providing a website with extensive sustainable living tips, so we

suggest the creation of a similar website with tips and resources for off-campus students seeking to minimize their environmental impact. Our team has already started the creation process by researching different "Do-It-Yourself" topics and writing brief sustainability-related articles.

Conclusions

Overall, this project yielded some interesting findings in terms of comparing carbon emissions of on-campus and off-campus students, showing that off-campus residents have greater emissions than on-campus residents. Taking advantage of the circumstances leftover from last year's project, our team was able to create a more streamlined survey that generated three times the amount of survey respondents from last year. Although our survey yielded 100 responses, we consider our sample size to be an adequate representation of the current off-campus undergraduate population as of now, but we believe this can be improved in the future. We accomplished our goal of creating a more user-focused survey, while calculating a preliminary carbon footprint based off of energy billing data from survey respondents. Preliminary analysis of the various types of energy sources used for both on-campus and off-campus has been conducted in order to draw a better comparison between off-campus and on-campus individuals, but further investigation is needed to adjust the carbon emission totals of both target groups. It is our hope that this continuing body of research of undergraduate-student greenhouse gas emissions will assist future teams and UCLA H&HS as they collectively attempt to achieve carbon neutrality for the campus.

References

"Co-Gen helps UCLA go green". UCLA Institute of the Environment and Sustainability, 2009,

<http://www.environment.ucla.edu/news/article.asp?parentid=3294>.

Environmental Awareness and Altruism Index Calculator. Prentice Hall, <http://www.prenhall.com/divisions/hss/app/social/addchap9.htm>.

"Institute of the Environment and Sustainability receives gift to help students promote sustainable practices". UCLA Institute of the Environment and Sustainability, 2010. <http://www.environment.ucla.edu/news/article.asp?parentid=9750>.

Los Angeles Department of Water and Power (LADWP). Power Content Label, 2012, < https://www.ladwp.com/ladwp/faces/ladwp/aboutus>.

On vs. Off Campus Action Research Team. Final Report, 2011.

PG&E Carbon Footprint Calculator, <http://www.pge.com/microsite/calculator/calc1.jsp>.

Southern California Edison (SCE). Power Generation, 2012, < http://www.sce.com/PowerandEnvironment/PowerGeneration/PowerProduction/default.htm>.

UCLA Climate Action Plan (CAP), 2008.

UCLA Student Housing Master Plan, 2007-2017.

Appendices

Appendix A

On-Campus Energy Data

GAS

Unit: 100 cubic feet

month	Students		Gas	Rate
Apr-11		9,534	34,164	3.58
May-11		9,534	28,063	2.94
Jun-11	n/a		16,309	
Jul-11	n/a		15,017	
Aug-11	n/a		12,621	
Sep-11	n/a		15,822	
Oct-11		10,559	27,247	2.58
Nov-11		10,559	33,210	3.15
Dec-11		10,559	27,042	2.56
Jan-12		10,559	35,948	3.40
Feb-12		10,559	39,213	3.71
Mar-12		10,559	32,889	3.11
			AVG Per Student	**3.13**

Electricity

Unit: KWH

month	Students		Electricity	Rate
Apr-11		9,534	1,808,149	189.65
May-11		9,534	1,927,874	202.21
Jun-11	n/a		1,658,280	
Jul-11	n/a		1,684,400	
Aug-11	n/a		1,803,776	
Sep-11	n/a		1,776,229	
Oct-11		10,559	2,011,081	190.46
Nov-11		10,559	2,076,753	196.68
Dec-11		10,559	1,138,755	107.85
Jan-12		10,559	1,741,115	164.89
Feb-12		10,559	1,883,320	178.36
Mar-12		10,559	1,830,782	173.39
			AVG Per Student	**175.44**

Appendix B

Energy Sources

SCE leads the nation in renewable energy, delivering approximately 15.5 billion kilowatt-hours of renewable energy to customers in 2011. This constitutes about 21.1 percent of the energy we deliver to customers. In 2011 SCE signed 15 contracts for 920 megawatts of renewable power. These contracts have the potential of providing 2.4 billion kilowatt-hours of electricity — enough for more than 364,000 average-sized homes for a year.

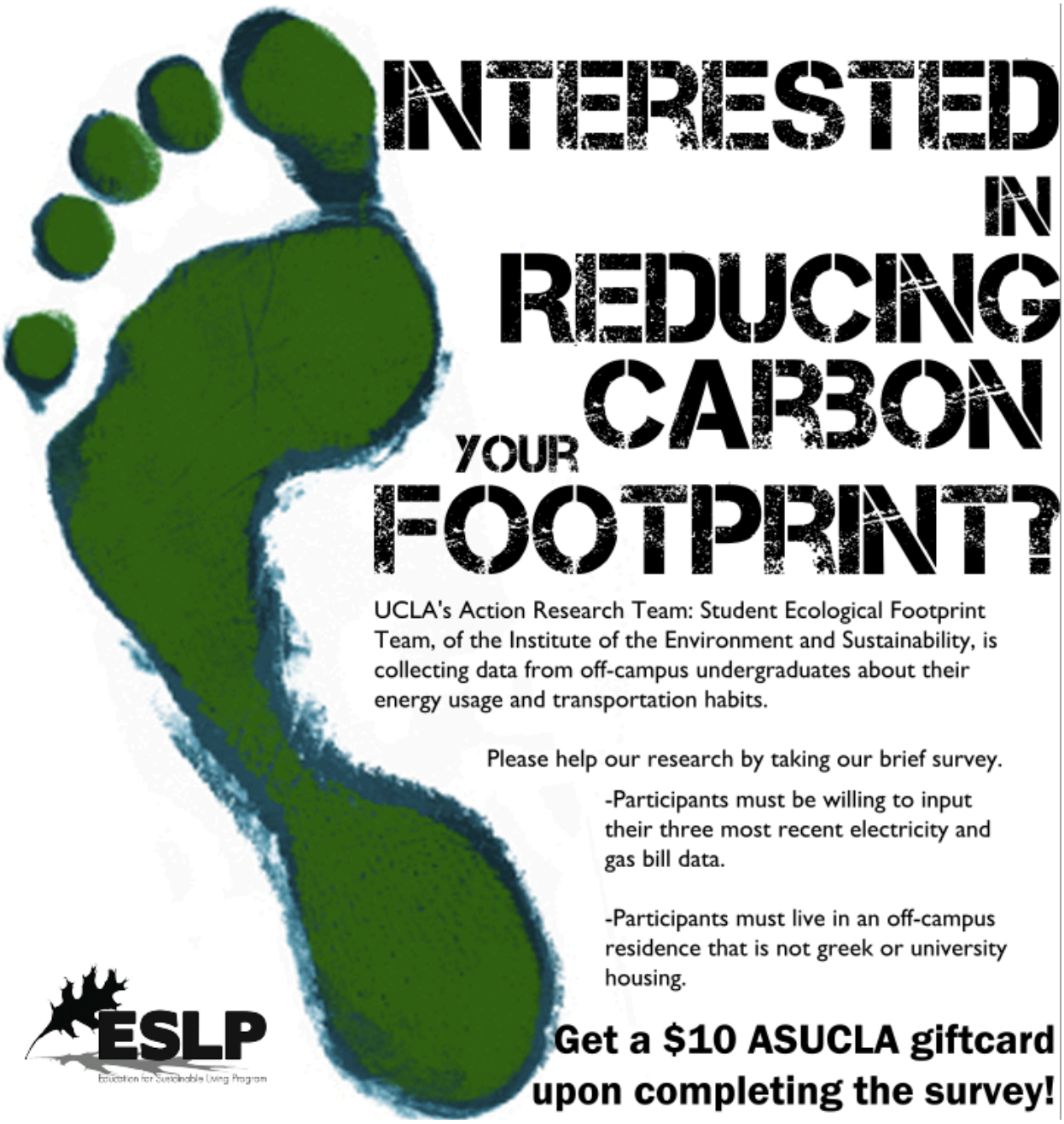
2011 Renewables Summary			
	CAPACITY (MW)	**DELIVERED IN 2011 (GWh)**	**PERCENTAGE OF SCE's RENEWABLE PORTFOLIO (%)**
Wind	2,315	5,502	35%
Geothermal	932	7,270	47%
Solar	433	995	6%
Small Hydro	227	920	6%
Biomass	129	857	6%
Total	**4,036**	**15,544**	**100%**

Annual Report of Actual Electricity Purchases for LADWP Calendar Year 2010

ENERGY RESOURCES	LADWP Power ACTUAL MIX	LADWP Green Power ACTUAL MIX	2010 CA POWER MIX** (for comparison)
Eligible Renewable* **	**20%**	**100%**	**14%**
-- Biomass & waste	4%	59%	2%
-- Geothermal	1%	0%	5%
-- Small hydroelectric	7%	41%	2%
-- Solar	0%	0%	0%
-- Wind	8%	0%	5%
Coal	**39%**	**0%**	**7%**
Large Hydroelectric	**3%**	**0%**	**11%**
Natural Gas	**22%**	**0%**	**42%**
Nuclear	**11%**	**0%**	**14%**
Unspecified sources of power*	**0%**	**0%**	**0%**
Other	**5%**	**0%**	**12%**
TOTAL	**100%**	**100%**	**100%**

Appendix C

Flyer Sample



Appendix D

Final Survey

Basic Questionnaire

Residential Life Survey

Thank you for filling out this survey. Your responses will be used to form recommendations to UCLA Housing and UCLA's Education for Sustainable Living Program (ESLP). Your personal information will remain confidential and be dissociated from your responses if these findings are published. Upon completion, you will be eligible to receive a $10 ASUCLA gift card.

NOTE: You may save your entries and return to the survey at a different time. All surveys must be completed by Sunday, May 6, 2012

What is your major?

What is your year at UCLA?

1st	2nd	3rd	4th	5th
○	○	○	○	○

What type of residence do you currently live in?

- ○ Off-campus private apartment
- ○ Private home

Please enter the following information about your off-campus private apartment. Your address will be used strictly to calculate mileage from campus.

Apartment complex name, if any

Address and/or cross streets

ZIP Code

Number of residents in your unit

Number of bedrooms in your unit

Please enter the following information about your private home. Your address will be used strictly to calculate mileage from campus.

Home Address and/or cross streets

ZIP code

Number of residents in home

Number of rooms

Year built (approximate if unsure)

Distance from campus (in miles)

How do you get to campus?
Select the answer for the mode you use most often (70% of the time or more).

- Car
- Carpool
- Public Transit
- Bicycle
- Walking/Skateboarding

Please type the year, make, and model of the car you use to get to school.

Year

Make

Model

Does your apartment building / home have recycling bins available to you?

- Yes
- No

Do you actively recycle in your apartment / home?

- Yes
- Somewhat consistently / Not everything
- No

Do you use CFL bulbs for lighting in your apartment / home? For more information about CFL bulbs, see this help page.

- Yes
- No

How likely would you be to change your light bulbs to CFL bulbs if they were given to you?

- Unlikely
- Possibly

- ○ Likely

Does your apartment building / home have on-site compost OR a green-waste bin that accepts food waste, available to you?

- ○ Yes
- ○ No

Do you actively collect compost in your apartment / home?

- ○ Yes
- ○ No

How likely would you be to compost if your residence had a composting program?
(If you had the ability to collect compost in your apartment / house and take it or have it get picked up to get composted)

- ○ Unlikely
- ○ Possibly
- ○ Likely

In your residence, what utilities do you pay for *separately from your rent*? (you pay based on your actual use)
Select all that apply.

- ☐ Electricity
- ☐ Gas
- ☐ Waste Removal
- ☐ Water
- ☐ Internet
- ☐ I do not pay separately for utilities

ELECTRICITY
How much electricity does your residence use each month?

Please provide actual amounts as stated on your bill for the 3 most recent billing cycles from our due date (May 6). These amounts are also available online where you may set up an account with your electricity company to view statements online. For help finding these numbers, see this example bill explained.

NOTE: You may be billed bi-monthly (ex. for 45 days or 60 days) - if this is the case, make sure to note the number of days billed. Exclude any rollover charges ($) from previous unpaid months.

Who is your Electricity Provider?

- ○ Los Angeles Department of Water and Power (LADWP)
- ○ American Utility Management (AUM)
- ○ Other:

Billing Cycle 1

Dates Billed i.e. (10/15/11 - 11/15/11)

Total kWh used

Total days for kWh use / "Days Billed"

Total paid for electricity

Billing Cycle 2

Dates Billed i.e. (11/15/11 - 12/15/11)

Total kWh used

Total days for kWh use / "Days Billed"

Total paid for electricity

Billing Cycle 3

Dates Billed i.e. (12/15/11 - 1/15/12)

Total kWh used

Total days for kWh use / "Days Billed"

Total paid for electricity

GAS

How much gas does your residence use each month?

Please provide actual amounts as stated on your bill for the 3 most recent billing cycles from our due date (May 6). These amounts are also available online where you may set up an account with your gas company to view statements online. For help finding these numbers, see this example bill explained. For help with gas rates and billing terms, see this help page.

NOTE: You may be billed bi-monthly (ex. for 45 days or 60 days) - if this is the case, make sure to note the number of days billed. Exclude any rollover charges ($) from previous unpaid months.

Who is your Gas Provider?

- ○ Southern California Gas
- ○ Other:

Billing Cycle 1

Dates Billed i.e. (10/15/11 - 11/15/11)

Total Therms used

Total days for Therm use / "Days Billed"

Total paid for gas

Billing Cycle 2

Dates Billed i.e. (11/15/11 - 12/15/11)

Total Therms used

Total days for Therm use / "Days Billed"

Total paid for gas

Billing Cycle 3

Dates Billed i.e. (12/15/11 - 1/15/12)

Total Therms used

Total days for Therm use / "Days Billed"

Total paid for gas

Billing Cycle 4

Dates Billed

Total Therms used

Total days for Therm use / "Days Billed"

Total paid for gas

What appliances & electronics do you have in your apartment / house? Select all that apply.

- ☐ Dishwasher
- ☐ Refrigerator
- ☐ Mini-fridge
- ☐ Washing machine (if in your apartment, not building)
- ☐ Dryer (if in your apartment, not building)
- ☐ Microwave
- ☐ Air Conditioning
- ☐ Heater
- ☐ DVR
- ☐ LCD TV

Is your air conditioner electric or gas powered?

Electric Gas Not sure

Is your heater electric or gas powered?

Electric	Gas	Not sure

Does having to pay your utility bills separately from your rent influence your use of utilities (as it changes based on actual electricity / gas / water use)?

- Yes - I use less so I can pay less
- Somewhat - It affects my use only a small amount
- No - I use less for environmental reasons, cost is secondary or does not matter
- No - I use as much as I would regardless of monthly cost

Listed below are statements about the relationship between humans and the environment.
Please indicate the extent to which you agree with each item, as honestly as you can.

We are approaching the limit of the number of people the earth can support.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Humans have the right to modify the natural environment to suit their needs.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

When humans interfere with nature, it often produces disastrous consequences.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Human ingenuity will ensure that we do not make the earth unlivable.

Human ingenuity will ensure that we do not make the earth unlivable.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Humans are severely abusing the earth.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

The earth has plenty of natural resources if we just learn how to develop them.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Plants and animals have as much right as humans to exist.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

The balance of nature is strong enough to cope with the impacts of modern industrial nations.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Despite our special abilities, humans are still subject to the laws of nature.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree

- Neither Agree nor Disagree
- Agree
- Strongly Agree

The so-called "ecological crisis" facing humankind has been greatly exaggerated.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

The earth is like a spaceship with very limited room and resources.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Humans were meant to rule over the rest of nature.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

The balance of nature is very delicate and easily upset.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Humans will eventually learn enough about how nature works to be able to control it.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

If things continue on their present course, we will soon experience a major environmental catastrophe.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Thank you for participating in our survey. Your responses will be used to form recommendations to UCLA Housing and UCLA's Education for Sustainable Living Program (ESLP) in order to help them educate UCLA students about green living.

By completing this survey, you are eligible to receive a prize.
Please enter your email address below so we can contact you to receive your prize or if we have any questions regarding your responses. Your personal information will remain confidential and be dissociated from your responses if these findings are published in the future.