

ANALYSIS 1: RESEARCH

Introduction

Problem Statement

Student apartment buildings are made to be inexpensive for many reasons. One, students do not care as much about their living conditions. Two, students cannot afford any more expense. Therefore green student apartment buildings are not feasible, because students will not pay for the increased cost the buildings and its systems.

Goal

Is any of this true? The goal of this research is to disprove this problem statement and show that students not only want green buildings but are willing to pay more for them.

Expected Outcomes

It is expected that most students will be willing to pay more to live in a green building and want a higher quality of life.

How Can Owners Benefit

Existing

When apartment buildings are designed and constructed, the owner decides to reduce costs upfront as much as possible, such that the initial investment is lower. This course of action leads to cheap, high energy consuming buildings. The owner only focuses on the financial bottom line and does not care about their intense energy consumptive building, for two reasons. The first explanation is that if the building is inexpensively created then it will be even less cost incurred to fix. Since, college students break things whether it is roughhousing or a party, things will be damaged. Therefore, from an investor's standpoint, why spend the money on nicer materials and better quality construction, when it is too much of a financial risk.

Secondly, why would the owner pay upfront for energy efficient appliances and systems, if they can deflect the cost of the inefficiencies onto the students? The owners' lack of energy concerns is a major issue when approaching current construction methodology. The owners of apartments are not responsible, nor do they worry, about how the residents use their energy. Some students leave the blinds closed during the day and will have the lights on even when they are not there. Other students' tendencies are to leave their computers on all the time and sometimes even their television, even when they are not there. Unfortunately, this excessive use of energy may sound crazy but these types of practices occur all the time. A simple reason for this energy consumptive attitude could be that some students, just like the owners, do not understand the long-term repercussions and/or care.

The thoughts of college students tend to leave them paying for large energy bills, which they already struggle paying. Throughout campuses, a selection of the student population would rather live without heating and air-conditioning to avoid bills. Yet, if the initial cost incurred for more energy efficient systems proved to be less expensive, this current state of approaching high energy consuming buildings might be altered. But, as of right now, none of this allows for any progression in the technologies implemented into student apartment buildings, unless it was cheap.

Proposed

Owners are passing up an enormous potential to make money. If owners include the energy bills in rent, then the owners would be paying the energy bills. This has the potential to be profitable if the owner invests in more efficient technology upfront, allowing them to reap the benefits and the cost savings. The owner could still charge the same amount for energy as what they have been paying before the switch. Not only could this make a student's life easier but could create a larger profit margin for the owner.

One potential problem with this system is that there will most likely be some students who do not care and will leave their lights, television, computer, etc, on all the time. This can destroy the goal of reducing the energy consumption for the owner. A possible solution to tackle this issue is to put a limit on the resident's energy consumption and if they go over that limit they will be charged.

How to Determine the Demand

To determine how much students would pay for a green building and what kind of demand exists for green student apartment buildings, a survey was written up and given out to Penn State students. This survey was structured in such a way that it was able to be filled out quickly and easily understood. The actual survey is on the page 19.

Forming the Survey

This survey was made to first determine what the student's current condition was, in terms of student housing and how the bills are allocated. The second half of the survey consists of questions that attempt to assess what kind of demand for different aspects of a green building and then to quantify personal value by willingness to defray costs. The goal was to split the rest of the survey into 5 questions based off of the LEED rating system, Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environment Quality. The final questions reflect these different topics, but are not directly out of them.

Each question was difficult to write, because a sincere response is necessary. Also many aspects of the LEED rating system and green design are integration, which can have the questions influence each other. The goal was to avoid integration to determine whether the student truly cares about living in a green building, as a whole or in particular aspects.

The first set of questions, within the second section of the survey, deals with Sustainable sites. This question was an attempt at understanding what a green outdoor space means to the student. Then following up by asking them to place a dollar value on how much they desire one. A concern with this section of questions is if it distinguishes between the student caring about the space's environmental impact and just wanting a nice place to hang out. Obviously both aspects are positive features of a green space and are most likely desirable, but there is no indication of their motive behind their assessment of the space. Specifically in this survey it is a possible source of error, however to correct it the survey would become increasingly longer and less likely for people to actually participate.

It was determined that trying to assess water usage would be difficult for the students taking the survey to understand. Creating a question that deals with water, while proving there is a demand for student apartment buildings, may be difficult. Thus, the second question deals with energy and assesses how the student feels about where the energy comes from. The follow up question was to quantify how much more they are willing pay for clean energy.

The third sets of questions touches on indoor environment and energy together. It deals with adequate light levels within the students have in their apartment. They were asked, if during the day, do they feel there is enough daylight coming into their space. Then, once again, it was asked how much they would pay for the correct amount of daylight. These questions became tricky to formulate because it touches on two different areas, while potentially expanding to a third. Having too much glass could increase the heat transferring through the wall of the building, but achieves the most daylight. To avoid undesired complexity, these questions were worded carefully. The reason this section on day lighting was included, was because students can easily relate to it and is often an area not done correctly in student apartment buildings.

The fourth group of questions was an attempt to understand students' opinions on materials, how they are manufactured, and what kind of elements go into them like whether they are organic or potentially toxic. This does not address the main focus of LEED with respect to Materials & Resources which is where the material comes from, how much was recycled, how much is thrown out. It does make an effort to get the students to begin to grasp these complex notions of hazardous materials that exist throughout our daily lives. To reduce confusion an example of these types of materials and conditions were added. Once again, the students were asked to place a monetary value on the improvement of their environment.

Subsequently, last question set deals with Indoor Environmental Quality, with respect to fresh air and health. This section is such an important area to ask about, especially for students with asthma or allergies or other health concerns. However everyone should relate to these questions, since respiratory function is vital to human survival. Because the value on quality life plays a distinct role, financially quantifying costs are requested.

Expected Outcomes

It is expected that around 75% care about the different topics that the questions address, yet only 50% would be willing to pay more for them. Some possible costs incurred to the students are expected to be higher than others, for instance it is expected that air quality is the highest, then continuing to, green outdoor space, daylight, energy, materials. The reason behind this projection it might be in order of how each directly affects the student, only limited to his or her own knowledge.

Architectural Engineering - Senior Thesis Research Survey

Kyle Macht

Please either circle or fill in the blank, for your most correct answer.

Age: _____ Male or Female
 Major: _____

- Do you live in a student apartment building or a dorm? Y N

- Do you personally pay your own rent? Y N
 If so, how much do you pay per month? \$ _____

- Do you pay your own electric and heating bill? Y N
 If so, how much do you pay on average per month? \$ _____

- 1 Do you have a green outdoor space nearby your current apt. building? Y N
 2 How much would you be willing to pay a month to have a usable, exterior green space? \$ _____

- 1 Do you care where your energy is currently coming from? Y N
 2 How much would you be willing to pay a month to have environmentally friendly energy, such as solar and wind? \$ _____

- 1 Do you feel that you have enough daylight in your current apt. such that you don't need to turn on the lights during the day? Y N
 2 How much would you be willing to pay a month for sufficient daylight in your apartment such that you wouldn't need other lighting during the day? \$ _____

- 1 Do you care about the environmental impacts of the materials in your apt.? For instance, was the wood sustainably harvested or from an old growth forest. Were your materials made from recycled content. Y N
 2 How much would you pay to minimize the overall environmental impacts, with respect to materials? \$ _____

- 1 Are you concerned about the contents of the air you breath in your current apt.? For example, the air having high CO₂ levels, mold, potential harmful chemicals that can get trapped in fabrics and carpet. Y N
 2 How much would you be willing to pay for cleaner air ? \$ _____

- 1 Did you answer 4 out of the 5 questions labeled #2, with a number greater than 0? Y N
 a If no, would you want to live in a green building if it cost the same? Y N

 b If yes, you want to live in a green student apartment building! This type of building is healthier for you and the environment, adn uses less energy the typical building. You said that you would be willing to pay more for this building, however you do not have too! When designed correctly, green buildings can potentially cost less.

Thank You!

Survey Results

Before analyzing the data received, let's discuss things the reactions occurred while the survey was being taken. The main locations of the survey were at the HUB during dinner time, all on the same day, and in an Industrial Engineering class. The differences in locations on campus were to collect a representative sample, so that where the survey was taken did not impact the results. This was able to be an unbiased survey due to the amount of different ages, majors, and ethnicities.

It was interesting how students responded when being asked to take the survey. Some said "Sure" and were more than happy to help. Some were very skeptical and they had to think about it before they said yes. Some wanted to know what it was about beforehand. Some were silent through the survey, while others talked a lot and asked a lot of questions. Overall only 7 people declined. One student was eventually convinced by a friend to take it and the others had only said no because they had a test in 30 minutes.

There were a total of 99 surveys filled out and only 1 was not used in the results due to a lack of useful answers on the survey. There were 10 determined to be unreasonable and were separated from the rest of the results, due to the extremely high amounts the students were willing to pay.

It was interesting to observe the students taking the survey. Some flew right through, either because they did not care about the survey or they said no to all the answers meaning. If they said no to all the questions, it was obvious they do not care about green buildings. It was interest to observe that many groups of students would answer similarly to one another. In most cases, this type of response pattern was consistent.

Survey Results Pay Their Own Rent											
\$ Rent	Landscape	Energy	Daylight	Materials	IAQ	Total x/5	\$	%	Green	Green With no \$	
420	\$ 7.50	\$ 35.00	\$ 15.00	\$ 15.00	\$ 15.00	5	\$ 87.50	21%	Yes	Yes	
388	\$ -	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	4	\$ 80.00	21%	Yes	Yes	
500	\$ -	\$ 30.00	\$ 10.00	\$ 50.00	\$ 10.00	4	\$ 100.00	20%	Yes	Yes	
620	\$ 20.00	\$ 10.00	\$ 10.00	\$ 5.00	\$ 20.00	5	\$ 65.00	10%	Yes	Yes	
350	\$ 5.00	\$ 10.00	\$ 10.00	\$ -	\$ -	4	\$ 25.00	7%	Yes	Yes	
372	\$ -	\$ 50.00	\$ -	\$ 20.00	\$ 20.00	3	\$ 90.00	24%	No	Yes	
525	\$ -	\$ 50.00	\$ 40.00	\$ 15.00	\$ 5.00	4	\$ 110.00	21%	Yes	Yes	
352	\$ -	\$ 25.00	\$ 20.00	\$ 20.00	\$ 5.00	4	\$ 70.00	20%	Yes	Yes	
375	\$ 15.00	\$ 30.00	\$ 15.00	\$ 20.00	\$ 20.00	5	\$ 100.00	27%	Yes	Yes	
800	\$ -	\$ -	\$ -	\$ 20.00	\$ 50.00	2	\$ 70.00	9%	No	Yes	
525	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	0%	No	Yes	
300	\$ 50.00	\$ 150.00	\$ -	\$ -	\$ 50.00	3	\$ 250.00	83%	No	Yes	
395	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	0%	No	Either	
380	\$ 20.00	\$ 10.00	\$ 10.00	\$ -	\$ -	3	\$ 40.00	11%	No	Yes	
770	\$ -	\$ 30.00	\$ -	\$ 30.00	\$ 50.00	3	\$ 110.00	14%	No	Yes	
605	\$ -	\$ 30.00	\$ -	\$ 10.00	\$ 10.00	3	\$ 50.00	8%	No	Yes	
620	\$ -	\$ -	\$ 20.00	\$ 10.00	\$ 5.00	3	\$ 35.00	6%	No	Yes	
392	\$ 20.00	\$ -	\$ 5.00	\$ -	\$ 10.00	3	\$ 35.00	9%	No	Yes	
430	\$ -	\$ 50.00	\$ -	\$ 10.00	\$ 10.00	3	\$ 70.00	16%	No	Yes	
418	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	0%	No	Yes	
500	\$ 15.00	\$ 10.00	\$ 20.00	\$ 30.00	\$ 10.00	5	\$ 85.00	17%	Yes	Yes	
335	\$ 10.00	\$ 20.00	\$ 5.00	\$ 5.00	\$ 10.00	5	\$ 50.00	15%	Yes	Yes	
450	\$ 150.00	\$ 50.00	\$ -	\$ -	\$ -	2	\$ 200.00	44%	No	Yes	
400	\$ -	\$ -	\$ -	\$ -	\$ 100.00	1	\$ 100.00	25%	No	Yes	
445	\$ 10.00	\$ -	\$ -	\$ -	\$ 10.00	2	\$ 20.00	4%	No	Yes	
425	\$ -	\$ -	\$ -	\$ 25.00	\$ 55.00	2	\$ 80.00	19%	No	Yes	
550	\$ -	\$ 50.00	\$ 20.00	\$ 20.00	\$ 20.00	4	\$ 110.00	20%	Yes	Yes	
300	\$ 5.00	\$ 30.00	\$ 30.00	\$ 50.00	\$ 10.00	5	\$ 125.00	42%	Yes	Yes	
345	\$ 5.00	\$ 13.50	\$ 5.00	\$ 5.00	\$ 15.00	5	\$ 43.50	13%	Yes	Yes	
460	\$ 20.00	\$ 10.00	\$ 15.00	\$ 10.00	\$ -	4	\$ 55.00	12%	Yes	Yes	
400	\$ -	\$ -	\$ -	\$ 10.00	\$ -	1	\$ 10.00	3%	No	Yes	
325	\$ -	\$ -	\$ 10.00	\$ -	\$ 20.00	2	\$ 30.00	9%	No	Yes	
360	\$ -	\$ -	\$ -	\$ 20.00	\$ -	1	\$ 20.00	6%	No	Yes	
560	\$ -	\$ 60.00	\$ -	\$ -	\$ 50.00	2	\$ 110.00	20%	No	Yes	
350	\$ 15.00	\$ 75.00	\$ 25.00	\$ 15.00	\$ 10.00	5	\$ 140.00	40%	Yes	Yes	
345	\$ -	\$ -	\$ -	\$ -	\$ 10.00	1	\$ 10.00	3%	No	Yes	
300	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	0%	No	Yes	
324	\$ -	\$ -	\$ -	\$ -	\$ 50.00	1	\$ 50.00	15%	No	Yes	
500	\$ 10.00	\$ 10.00	\$ 10.00	\$ 10.00	\$ 10.00	5	\$ 50.00	10%	Yes	Yes	
346	\$ -	\$ 10.00	\$ 50.00	\$ 10.00	\$ 50.00	4	\$ 120.00	35%	Yes	Yes	
424	\$ 20.00	\$ 30.00	\$ 20.00	\$ 30.00	\$ 50.00	5	\$ 150.00	35%	Yes	Yes	
380	\$ -	\$ -	\$ -	\$ 6.00	\$ 30.00	2	\$ 36.00	9%	No	Yes	
400	\$ 10.00	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	5	\$ 22.00	6%	Yes	Yes	
400	\$ 20.00	\$ 15.00	\$ 5.00	\$ 20.00	\$ 20.00	5	\$ 80.00	20%	Yes	Yes	
500	\$ 20.00	\$ 10.00	\$ -	\$ -	\$ 15.00	3	\$ 45.00	9%	No	Yes	
285	\$ 15.00	\$ 10.00	\$ 5.00	\$ 5.00	\$ 5.00	5	\$ 40.00	14%	Yes	Yes	
290	\$ 10.00	\$ 10.00	\$ -	\$ -	\$ -	2	\$ 20.00	7%	No	No	
AVG	\$ 10.05	\$ 20.14	\$ 8.47	\$ 11.04	\$ 18.15	3.09	\$ 67.85	17%			

Survey Results Do Not Pay Their Own Rent									
Don't Pay rent	Landscape	Energy	Daylight	Materials	IAQ	Total x/5	Total More	Green	Green With no \$
\$ -	\$ 20.00	\$ -	\$ 10.00	\$ 10.00	3	\$ 40.00	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ -	\$ -	\$ 50.00	\$ 25.00	\$ 50.00	3	\$ 125.00	No	Yes	
\$ -	\$ -	\$ 20.00	\$ -	\$ -	1	\$ 20.00	No	Yes	
\$ -	\$ -	\$ 20.00	\$ 10.00	\$ 10.00	3	\$ 40.00	No	Yes	
\$ 20.00	\$ 20.00	\$ 20.00	\$ 10.00	\$ 30.00	5	\$ 100.00	Yes	Yes	
\$ -	\$ -	\$ 10.00	\$ 10.00	\$ 5.00	3	\$ 25.00	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ -	\$ 1.00	\$ -	\$ 1.00	\$ 5.00	3	\$ 7.00	No	Yes	
\$ -	\$ -	\$ -	\$ 20.00	\$ 10.00	2	\$ 30.00	No	Yes	
\$ -	\$ 20.00	\$ 5.00	\$ 5.00	\$ 5.00	4	\$ 35.00	Yes	Yes	
\$ 15.00	\$ 20.00	\$ 10.00	\$ 15.00	\$ 10.00	5	\$ 70.00	Yes	Yes	
\$ -	\$ -	\$ 25.00	\$ -	\$ 50.00	2	\$ 75.00	No	Yes	
\$ 20.00	\$ 10.00	\$ -	\$ 20.00	\$ -	3	\$ 50.00	No	Yes	
\$ 10.00	\$ 20.00	\$ 10.00	\$ 15.00	\$ 5.00	5	\$ 60.00	Yes	Yes	
\$ 5.00	\$ 5.00	\$ 5.00	\$ 25.00	\$ 10.00	5	\$ 50.00	Yes	Yes	
\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	5	\$ 100.00	Yes	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ 50.00	\$ -	\$ -	\$ -	\$ 50.00	2	\$ 100.00	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ 20.00	\$ 40.00	\$ 40.00	\$ 40.00	\$ 20.00	5	\$ 160.00	Yes	Yes	
\$ -	\$ 50.00	\$ 40.00	\$ 20.00	\$ 20.00	4	\$ 130.00	Yes	Yes	
\$ -	\$ -	\$ 30.00	\$ -	\$ 40.00	2	\$ 70.00	No	Yes	
\$ 50.00	\$ -	\$ 10.00	\$ -	\$ 20.00	3	\$ 80.00	No	Yes	
\$ 20.00	\$ 10.00	\$ 10.00	\$ -	\$ 25.00	4	\$ 65.00	Yes	Yes	
\$ -	\$ 20.00	\$ -	\$ 20.00	\$ 20.00	3	\$ 60.00	No	Yes	
\$ -	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	4	\$ 80.00	Yes	Yes	
\$ 7.50	\$ 7.50	\$ 15.00	\$ 10.00	\$ 25.00	5	\$ 65.00	Yes	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ 50.00	1	\$ 50.00	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ 20.00	\$ 50.00	\$ 10.00	\$ -	\$ -	3	\$ 80.00	No	Yes	
\$ -	\$ 10.00	\$ -	\$ -	\$ 20.00	2	\$ 30.00	No	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
\$ 12.50	\$ -	\$ 25.00	\$ 50.00	\$ -	3	\$ 87.50	No	Yes	
\$ 50.00	\$ 50.00	\$ 20.00	\$ 20.00	\$ 50.00	5	\$ 190.00	Yes	Yes	
\$ -	\$ 7.50	\$ 10.00	\$ 30.00	\$ 12.50	4	\$ 60.00	Yes	Yes	
\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	No	Yes	
AVG	\$ 7.80	\$ 9.78	\$ 10.37	\$ 9.66	\$ 14.45	2.49	\$ 52.06		
Total									
AVG	\$ 9.01	\$ 15.31	\$ 9.35	\$ 10.40	\$ 16.43	2.81	\$ 60.49	No BIG Numbers	

Survey Results Off the Charts									
Don't Pay rent	Landscape	Energy	Daylight	Materials	IAQ	Total x/5	Total More	Green	Green With no \$
	\$ -	\$ 30.00	\$ 100.00	\$ -	\$ 1,000.00	3	\$ 1,130.00	No	Yes
	\$ 450.00	\$ 50.00	\$ 50.00	\$ -	\$ 25.00	3	\$ 575.00	No	Yes
	\$ -	\$ 70.00	\$ 50.00	\$ 100.00	\$ 70.00	4	\$ 290.00	Yes	Yes
	\$ 250.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	5	\$ 330.00	Yes	Yes
	\$ 60.00	\$ 60.00	\$ 40.00	\$ 50.00	\$ 75.00	5	\$ 285.00	Yes	Yes
	\$ -	\$ 100.00	\$ 25.00	\$ 100.00	\$ 50.00	4	\$ 275.00	Yes	Yes
	\$ -	\$ -	\$ 20.00	\$ 70.00	\$ 70.00	3	\$ 160.00	No	Yes
	\$ 200.00	\$ 100.00	\$ 50.00	\$ 50.00	\$ 200.00	5	\$ 600.00	Yes	Yes
510	\$ 100.00	\$ 100.00	\$ 50.00	\$ 50.00	\$ 500.00	5	\$ 800.00	Yes	Yes
3500	As Much As Needed					5	A Lot	Yes	Yes
AVG	\$ 117.78	\$ 58.89	\$ 45.00	\$ 48.89	\$ 223.33	4.2	\$ 60.52		

Results

The general layout of these surveys first show the rent, that the students pay, in the left most column. Then the next five are how much they would pay more in the respective areas. To the right of that is the total number of areas that the student would be willing to pay more for. The next column shows the total that students would pay for these different areas. Out of the two columns to the right, the first answers yes if there is at least four areas that the student would be willing to pay more for and on the right whether the student would prefer a green student apartment building if it cost the same as a typical apartment building. In the table *Survey Results Pay Their Own Rent* includes the students rent, it also shows how much of a percentage are the students willing to pay over what they do.

It is clear that from the right most column in all tables, that all but two students do prefer a green student apartment building if they were the same cost as a typical building. As for the two who dismissed the idea of a green building, the one student made a note on the survey stating that he did not care and the other might have been a mistake or a misunderstanding of the question. The results show that 99% of students want green student apartment buildings; there is an evident demand. 41% of students are willing to pay more within four different areas. 85% of students are willing to pay some amount more for a green student apartment building. Once again it is clear that students want a green apartment building.

As expected students are willing to pay the most for cleaner air, however, a green outdoor space and day lighting, which were predicted as second and third were fifth and fourth respectively. Students said they would defray quite a bit more, putting energy in second. Third goes to materials, which was expected to be ranked last.

There are differences between all the questions, however the most significant difference is whether the students answer is for a better world or just a personal benefit. The questions pertaining to energy and materials have the most global of an impact, where the other three could be looked at as just a personnel benefit. Meaning that choosing to pay more for greener power does not change things on the resident's side, it just helps combat global warming and an energy crisis. Similar aspect with the materials, the major difference with those is the energy of creating the product and its impact on the environment throughout the materials life. Where, having better ventilation helps the resident more than the environment.

Keeping this in mind, let's look at the analysis again. Starting at the first question moving to the last question, these are the amount of people willing to pay more, 43%, 59%, 57%, 59%, 72%. All are similar except for two extreme parts of the range. Air quality, which was expected to be the maximum, was at 72% and an exterior green space proved to be the minimum value at 43%. The exterior green space was not predicted to be the last value. Thus a potential form of error is in flawed wording. Many people might have referred to exterior spaces as in the fields and campus that are free. So why would a student pay for one at their apartment, hence the least percentage.

These numbers also show that the overall people who will pay more are willing to pay the most for green energy compared to all the other areas.

Summary

This data clearly shows that students want to live in green apartment, 98% said they did. However, not everyone was willing to pay for it, 85% said they would. 41% of students are willing to pay more in 4 different areas. These numbers clearly show that there is a demand for green housing. That almost half of the students want more out of their housing, whether that is health, energy independency, or environmental sensitivity.

A way for owners to help make this transition and actually make some money off of being energy efficient is to include everything in rent. This allows an owner to make an investment up front and charge as if the same amount of energy was being used for a typical building.