Does Design Affect Behavior?

A case study of Pomona and Sontag Halls

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Introduction

Sustainable design, as an idea and as a reality, has taken significant strides forward in the last 20 years. During this time green buildings have been incorporated as an essential piece of the world's effort to reduce energy use, save water, and benefit the environment. However, as the need for a low-carbon future becomes more and more apparent, it is becoming increasingly clear that this cannot be achieved without incorporating more than simple technological advancements. To make the necessary reductions in carbon emissions, become as efficient as possible with water use, and otherwise improve residential sustainability, inhabitants must engage with their buildings to incorporate green living strategies and make conscious decisions about how resources are used within facilities. One approach to making these changes involves shifting the position of the occupant from a passive resident to an active player in improving efficiency. However, creating this shift requires changes in behavior, which are often hard to initiate and even harder to maintain – particularly for people who are unknowledgeable about environmental issues.[1] Consequently, engaging inhabitants in improving their environmental behavior is now a key issue in green building.

Design and architectural features can be incredibly beneficial in fostering this engagement, as they can be used to compel behavioral changes that will lower energy and water use. There is an almost infinite range of possibilities for architectural design features capable of impacting the behavior of residents, making it impossible to list every option. However, the effects they create can be divided into two basic categories:

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[1] Abrahamse, Wokje. "A review of intervention studies aimed at household energy conservation." *Journal of Environmental Psychology.* 25.3 (2005): 273-291. Web. 10 Nov. 2011. <http://www.sciencedirect.com/science/article/pii/S027249440500054X>.

efficiency behaviors and curtailment behaviors.[2] Efficiency behaviors are usually one-time decisions that continue to have positive impacts after the decision is made. Examples of design features that demonstrate an efficiency behavior would be installing insulation or purchasing energy efficient appliances. Efficiency behaviors can also include decisions that, once implemented, force sustainable behavior to continue. An example of this would be making the decision to install motion sensor lights. This is a one-time decision that will continue to save energy despite no requirements for further changes in habits or individual behavior. Curtailment behaviors, by contrast, require repetitive effort to reduce energy use, and would include things like physically turning off lights or using cold water to wash clothes. Different sustainable design strategies are used to influence each of these behaviors, and each can be incorporated in either the architectural phase or make their mark later on in the process.

Architectural design features can also be categorized by whether their principal function is to influence behavior. Some features, such as window placement and natural ventilation, have long been utilized in architecture without being directly associated with inhabitant decision-making. However, it is important to recognize the connections that exist between the use of these architectural features and the decisions made by occupants. For example, windows placed on the south side of buildings provide more natural daylight and can therefore reduce the use of artificial lighting. Similarly, good natural ventilation can decrease the need for air conditioning. Recognizing that these elements have behavior-

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[2] Abrahamse, Wokje. "A review of intervention studies aimed at household energy conservation." *Journal of Environmental Psychology*. 25.3 (2005): 273-291. Web. 10 Nov. 2011. <http://www.sciencedirect.com/science/article/pii/S027249440500054X>.

influencing capabilities can allow us to use them in the most effective ways. By consciously recognizing a new function for elements that have always been considered in architecture, we can begin to use them to maximize energy efficiency without sacrificing their original purpose.

Other design features offer more direct options that can be incorporated with the intention of influencing occupant behavior. A prime example of this is an increase in the information available to occupants. This information can come from a variety of sources, including written information on the best ways to conserve energy and water, or real-time monitoring that allows occupants to keep track of their electricity consumption and encourages reductions by allowing people to see immediate cause and effect processes. Although architectural design is capable of influencing behavior in ways that will conserve natural resources and improve green buildings, there has been little research done to show just how effective these measures are – both in initiating behavior changes and in statistically reducing energy use.

Gathering as much information as possible on the success of these strategies is critical. The objective of behavioral design changes is to put the responsibility for sustainable living in the hands of the occupant. Ideally, in a green building that is incorporating behavior-influencing design features, the occupant is put in a living situation with a high probability of success, given information on how to correctly use the space, and encouraged to make the best decisions by utilizing design elements. However, unlike with renewable energy sources, good insulation, or other built-in components that function on their own, with behavioral features the occupants are ultimately responsible for the

success - or lack thereof. Because of this, determining what does and does not work is essential.

Although using design to directly influence occupants' energy use and level of sustainability is a relatively new idea, it has roots in architectural determinism, a movement originating during the enlightenment which sees the built environment as the primary or sole determinant of individual behavior.[3] True architectural determinism, according to Maurice Broady, an author and architect who coined the phrase in a 1966 paper, "implies a one-way process, in which the physical environment is the independent, and human behavior the dependent variable. It suggests that those human beings for which architects and planners create their designs are simply molded by the environment which is provided for them."[4] Although these ideals laid a foundation for environmental architecture, general feelings among architects and theorists tend to hold a more conservative view on the true power of the built environment; many now believe that it has the ability to affect and shape our lives without being the primary force.[5]

The relationships between humans and environments also contain aspects of social and psychological influences along with physical impacts; it is impossible to consider the relationship between people and space as a one-way street. It seems that Winston Churchill managed to grasp this complexity with the simple statement that: "We shape our

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[3]Marmot, Alexi. "Architectural determinism, Does design change behaviour?." *British Journal of General Practice.* (2002): 252-253.
[4] Maurice Broady. "People and Buildings: Social Theory in Architectural Design" pg. 174 http://www.498nm.com/archithesis/architectural-determinism
[5] *Ibid.*

buildings and then they shape us."[6] It is this belief, that architectural design is capable of shaping us but that it is unable to force specific behavior upon us, that applies most directly to the intentions of creating sustainable buildings through the active participation of their occupants. Although the idea that architecture alone is capable of bettering society is appealing, acknowledging the potential shortcomings of this is key to the ultimate success of architectural determinism. We are now faced with the task of correctly identifying the limitations design has in shaping behavior in order to improve our approaches to sustainable architecture and design. My thesis probes this by conducting a case study of two new dormitories built at Pomona College. I plan to evaluate the success of these buildings in their intention to shape the sustainable behavior of occupants.

Architectural Design and Behavior

The first step in evaluating the capabilities of design involves looking at the research that has already taken place, as this reveals what design has accomplished in the past as well as where its limitations lie. Design has long been advertised as having positive effects on behavior.[7] Designers will advertise that new office buildings can increase productivity or enhance communication and cooperation among employees.[8] The medical industry has

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[6] Brandon, Alison, Joan B. Hirt, and Tracey Cameron. "Where You Live Influences Who You Know: Differences in Student Interaction Based on Residence hall Design." *Journal of College and University Student Housing*. 35.2 (2008): 62-79.
[7] Marmot, Alexi. "Architectural determinism, Does design change behaviour?." *British Journal of General Practice.* (2002): 252-253.
[8] Hameed, Amina, and Shehla Amjad. " Impact of Office Design on Employees' Productivity: A Case study of Banking Organizations of Abbottabad, Pakistan." *Journal of Public Affairs, Administration and Management.* 3.1 (2009): 1-13. Web. 12 Nov. 2011. <http://www.scientificjournals.org/journals2009/articles/1460.pdf>.

been one of the greatest utilizers of design's capability to impact people in positive ways. [9] Certain design techniques have been found to facilitate mental functioning, minimize confusion, and allow more independent living for some patients with Alzheimer's disease.[10] Similarly, research comparing orthopedic and psychiatric patients in two hospitals – one newly designed and the other an older model – found that patients in newer wards gave reviews suggesting that the architecture had made them feel better, which was not the case in the old wards. The patients in the new psychiatric unit also had shorter average stays than in the other clinic.[11]

The majority of the studies focused on saving energy by affecting the behavior of occupants have focused on increasing the information available to people. One study focusing on this approach looked at the effectiveness of increasing the availability of information through workshops and distributed brochures, both of which included instructions on how to save water and electricity. The study found that although information led to higher levels of knowledge about how to live sustainably, it did not necessarily lead to behavioral changes. Participants in the study typically ended up expressing more concern for and awareness of energy efficiency, but did not seem willing to direct this towards changing their actions. [12] In this context, knowledge is referring to an individual's awareness and understanding of sustainable issues and how their decisions and behavior impact the environment.

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[10] Marmot, Alexi. "Architectural determinism, Does design change behaviour?." *British Journal of General Practice.* (2002): 252-253.
[10] Brawley E. "Designing for Alzheimer's Disease." New York. John Wiley and Sons, 1997.
[11] Regnier, V. "Assisted living housing for the elderly." New York. Van Nostrand Reinhold, 1994.
[12] Geller, E.S. "Evaluating energy conservation programs: Is verbal report enough?" *Journal of Consumer Research.* 8 (1981): 331–335.

Studies have also found strong correlations between the specificity of information and its success in enacting behavioral changes, with more specific instructions and suggestions being more likely to change people's behavior.[13] Similarly, correlations have been found between an occupant's level of knowledge of the space they are in and the actions they chose to take within it.[14] It has also been found in studies focusing on environmental behavior that information distributed in the form of mass media as opposed to being incorporated directly into the design process has increased willingness to act pro-environmentally.[15] However, this response was primarily limited to those who had already been behaving this way before the campaign. It seemed that mass media could only intensify beliefs people already had, but was generally not effective in enacting extreme behavioral changes. All of these conclusions suggest that when used correctly, information is capable of influencing behavior, but only when presented in specific ways will it initiate the desired effects. Overall, it seems that more research needs to be done to determine exactly what will or won't work for targeted audiences when trying to elicit specific behavior responses, as the number of factors influencing this are vast.

Identifying the factors that influence curtailment behavior represents one of the greatest struggles faced by any design measure intended to impact behavior, but doing so is necessary to manipulate actions in a desired way. There is clearly a gap present between

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[13] Abrahamse, Wokje. "A review of intervention studies aimed at household energy conservation." *Journal of Environmental Psychology.* 25.3 (2005): 273-291. Web. 10 Nov. 2011. <http://www.sciencedirect.com/science/article/pii/S027249440500054X>.
[14] Brown, Zosia, and Raymond J. Cole. "Influence of occupants' knowledge on comfort expectations and behaviour." *Building Research & Information.* 37.3 (2009): 227-245. Web. 10 Nov. 2011.
[15] *Ibid.*

what people think and the steps that they are willing to take.[16] Knowledge of the cause-and-effect relationships between buildings and behavioral outcomes is limited. Architects and designers often approach projects with the intent of providing a specific behavioral outcome, but rarely return to assess the success of their intentions.[17] This lack of post-occupancy evaluation is primarily due to limitations in time and money. After completing a project and moving on to the next one, there is rarely the budget available to return and conduct research.[18] Another factor comes from the potential of revealing inadequacies. While this would provide suggestions for improvements on future projects, it would also reflect badly on the original project team. Finally, the difficulty of analyzing what the results mean is a genuine concern. Although measuring people's reactions is relatively easy, correctly identifying what caused these reactions can be much more complicated.[19]

Studies on energy consumption behaviors have worked to identify some of the causal factors in people's behavioral reactions to a space. The difficulty of changing formed habits has been found to be one of the greatest inhibitors of transitions to more sustainable behaviors.[20] However, this can also be an encouraging fact, as it increases the probability that sustainable habits are maintained once they have been established. This means that the real hurdle faced by many designers is in controlling the initial reaction that occupants have to certain elements. Therefore, determining how best to present design elements in a

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[16] Peterson, John E., Vladislav Shunturov, Janda Kathryn, Gavin Platt, and Kate Weinberger. "Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives." *International Journal of Sustainability in Higher Education*. 8.1 (2007): 16-33.
[17] Marmot, Alexi. "Architectural determinism, Does design change behaviour?." *British Journal of General Practice*. (2002): 252-253.
[18] D[18] Oakley, Duke, architect for Pomona and Sontag Halls. Personal Interview. 06 Oct 2011.
[19] *Ibid.*
[20] Stephenson, Janet, Barry Barton, Gerry Carrington, Daniel Gnoth, and Rob Lawson. " Energy cultures: A framework for understanding energy behaviours." *Energy Policy.* 38.10 (2010): 6120-6129. <http://www.sciencedirect.com/science/article/pii/S0301421510004611>.

way that will motivate participation is the next critical step in perfecting architecture and design aimed at improving the sustainability of occupants.

Many of these presentation strategies are fairly straightforward and can be easily incorporated into a well thought-out design. For example, the accessibility of and ease with which certain behaviors can be adopted have a huge impact on the likelihood of these alterations taking place.[21] If a design is implemented in a way that minimally modifies the diversions from previous habits that need to be made, an individual is much more likely to change. This also applies to designs that skew results from what was originally intended. Switching from regular light bulbs to LEDs would be considered a positive efficiency behavior, but people are less likely to take this action if the quality of light from LED bulbs is not preferred.

There are also impacts that come from social expectations. This particularly affects residences housing several people. It has been found that people react differently when a space is shared with a greater number of other occupants.[22] Frequently this leads to behavioral design strategies having less of an impact than intended, because when more people inhabit a space each person feels a lesser sense of personal accountability, leading to less engagement in environmentally responsible behavior. Because of this it is important for architectural design strategies to be capable of overcoming this social barrier. However, social pressure can also have the opposite effect if the sustainable behavior is the dominant practice within a group or household.[23]

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[21] Brown, Zosia, and Raymond J. Cole. "Influence of occupants' knowledge on comfort expectations and behaviour." *Building Research & Information.* 37.3 (2009): 227-245. Web. 10 Nov. 2011.
[22] *Ibid.*
[23] *Ibid.*

Finally, economics can greatly influence environmental behavior in either direction. High energy or water costs are one way of driving down consumption and indirectly creating positive behavior changes.[24] Financial aspects are also incredibly important because they provide most households with the only source of direct feedback on their consumption. Regardless of the price level, periodic bills are often the only direct connection people have to their usage levels, and are therefore singularly responsible for creating an understanding of cause and effect when it comes to energy savings.

Although this in no way encompasses all of the elements that go into determining energy related behaviors, it touches on many of the most influential factors and gives a basic idea for complications that come along with trying to direct human behavior. In order to get a more accurate idea of how people react to specific design strategies, more research needs to be done on a small-scale, looking at implemented techniques and the responses to them. This should pay particular attention to how individuals respond differently in buildings that do and do not incorporate behavior-directed architectural design, as well as monitor the effectiveness of specific strategies. The gap between expected and actual behavior should be determined. Successful methods should be used to determine what works, while the setbacks should be identified for techniques that did not fulfill expectations. I feel that the most effective way to do this through a case study on a building or buildings that incorporate architectural design strategies intended to influence the sustainable behavior of occupants.

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[24] Stephenson, Janet, Barry Barton, Gerry Carrington, Daniel Gnoth, and Rob Lawson. " Energy cultures: A framework for understanding energy behaviours." *Energy Policy*. 38.10 (2010): 6120-6129. <http://www.sciencedirect.com/science/article/pii/S0301421510004611>.

Behavioral Design at Pomona College

Pomona College, a small, four-year liberal arts school in Claremont, California, is an ideal location for investigating these issues. In 2011 the school finished construction on two new residence halls that incorporated many design and architectural elements intended to influence residents' behavior. The buildings, named Pomona Hall and Sontag Hall, were designed by Steven Ehrlich Architects. The halls were commissioned in December of 2007 and it was decided that they would be built to LEED-Gold standards.[25] Each dorm is three stories tall, and together they house approximately 150 residents in suites of three to six people each. Each suite has an individual dorm room for each occupant as well as one or two shared bathrooms and a common room with a seating area, fridge, and microwave. Each building has its own laundry room as well as a lounge and kitchen on the first floor. In addition, each of the three floors has a smaller kitchen and common area that is open for use by all residents.

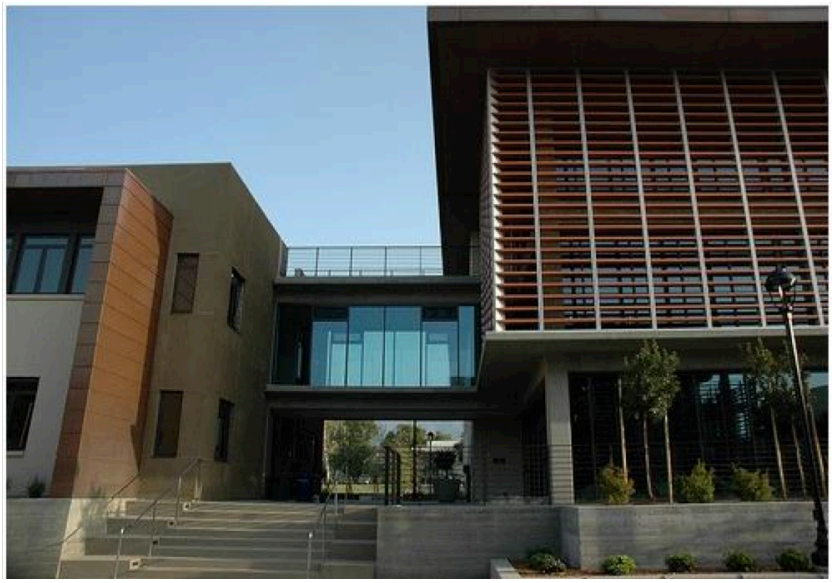

Image 1. Sontag Hall as seen from the south

Image 2. Courtyard outside Pomona Hall

The dorms visibly incorporate natural elements in their design, perhaps most notably with rock gardens straddled between outdoor entrances and indoor stairwells, and native trees and cacti surrounding the buildings. If it is possible for buildings to "look green" these certainly do. Perhaps it is the abundance of windows that creates a seamless transition between the indoor and outdoor areas or the patterned wood slats surrounding a section of each building on the outside. The natural paint colors and simple materials add to this effect as well, and the dorms seem to fit perfectly in the spaces they occupy (see Images 1 and 2).

The early stages of planning for the new dorms included several meetings attended by architects, faculty, administration, and a task force of students. The meetings were

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[25] CTG Energetics, Inc. "100% Construction Document Phase Energy Analysis Report." Message to Steven Ehrlich Architects. 30 Nov 2009. Since the planning stages the buildings have been LEED-Platinum certified.

intended to compile ideas and identify the priorities each group had for the dorms. The group agreed upon the fact that the buildings should be sustainable and built to LEED standards. However, the student task force was split on exactly what techniques should be implemented to make the dorms as green as possible. This debate revolved around whether the design should include elements that required occupant participation. Some students felt that including elements that required certain behaviors from students to improve energy use was a positive thing, while others believed that occupants should be able to passively live in the buildings without being responsible for its sustainability.[26] Ultimately it was decided that many behavior related architecture and design strategies should be used, but these did not encompass all of the possibilities or proposed components. In a conversation I had with Duke Oakley, one of the architects responsible for the project, I was told that the architecture of the dorms was intended to "facilitate a certain energy efficient design." I like this description in part because it highlights that these terms are not interchangeable; many aspects of a building's design are added well after the architecture is complete. But I also find the statement compelling because it clarifies the intentions of the building itself, including where it stands in relation to traditional views of architectural determinism. Stating that the dorms "facilitate" energy efficiency acknowledges that they have the capabilities to reduce carbon output and save electricity, but it does not ignore the fact that more required to be truly sustainable.

In the end, the dorms, completed in the spring of 2011, contain elements that represent efficiency and curtailment behaviors in their design and architecture. In this case, efficiency behaviors are decisions that were made by the school that will save energy

[26] Oakley, Duke, architect for Pomona and Sontag Halls. Personal Interview. 06 Oct 2011.

by removing residents' behavior as a factor for energy efficiency. Along with the one-time architectural choices that were made in order to qualify the building for LEED-Platinum status, such as solar photovoltaics and solar thermal panels for water heating, there are also several design elements that make certain aspects of occupant behavior irrelevant in terms of energy use. For example, the lights in all public hallways are sensor controlled.[27] These shut off a portion of the lights automatically when no one is present, saving a large amount of energy because lights in public spaces such as these stay on all the time. Similarly, the lights in the study rooms, public lounges, and kitchens have automatic daylighting controls.[28] These are stepped systems that automatically adjust brightness based on the amount of daylight present. This prevents occupants from turning on unnecessary electric lighting when natural light is sufficient.

The heating and air conditioning systems in the dorms are also adjusted to remove some occupant control and create energy savings. One system control element is the inclusion of an interlock between the mechanical and natural ventilation systems, which automatically switches off the heating or air conditioning when a window is opened. These interlocks exist in each dorm room as well as the suite common rooms, and they prevent energy losses that occur when mechanical heating or cooling escapes out open windows.[29] The heating and air conditioning systems also contain settings that limit their ability to control temperatures exactly. Between May 1st and October 20th heating cannot be turned

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[27] CTG Energetics, Inc. "100% Construction Document Phase Energy Analysis Report." Message to Steven Ehrlich Architects. 30 Nov 2009.
[28] *Ibid.*
[29] CTG Energetics, Inc. "Pomona College North Campus Residence Hall: Schematic Design Energy Analysis Report." Message to Steven Ehrlich Architects. 15 Jul 2008. E-mail.

above 60˚F and cooling cannot go below 76˚F. Between October 21st and May 1st heating will not go above 70˚F and cooling will not go below 80˚F.[30]

Despite objections from the group of students on the task force who preferred that the buildings be targeted towards passive residency, several curtailment behaviors were included in the design - many of them representing new and inventive sustainability measures. Informational signs including instructions on living in a green building were one of the most widely implemented strategies intended on pushing resident behavior towards more sustainable lifestyles. These are present in each dorm room, as well as in the suite common rooms and shared laundry room. In the dorm rooms and common rooms the information is posted in the form of small placards near the entrance door. They contain very brief instructions on ways to save on lighting, power, and heating and cooling. Suggestions include using daylight before overhead light, turning lights off when you leave, using windows shades, clothing, and the ceiling fan before the air conditioner. The common room placards are larger and also contain information on water use, appliances, and the building materials used on the dorms. In the laundry rooms are signs instructing that using cold water for washings, only doing full loads, using drying racks instead of dryers, using less detergent, and cleaning the lint screens before use are all good ways to live sustainably. There are clotheslines that can be used for hang drying within the laundry rooms and the washer settings have a clear “cold water” option.

Some of the instructions provided on the placards within the dorm rooms and suite common rooms briefly direct residents on how to best utilize other sustainability elements

[30] CTG Energetics, Inc. "100% Construction Document Phase Energy Analysis Report." Message to Steven Ehrlich Architects. 30 Nov 2009.

that have been incorporated into the buildings. To help residents limit their power use, each dorm room has a power on/off switch. Although the appearance is identical to a typical light switch, these instead control the connection of power to the outlets in the room. When the switch is off, the power is disconnected, preventing electricity loss to devices that are not in use. When the switch is on the outlets function normally. The thought behind this is that flipping a switch to save power is much easier than unplugging items anytime they are not in use, therefore leading more students to participate. Each room also has one outlet that is not connected to the switch and operates normally at all times. The placard in each dorm room informs occupants that this outlet is marked with a "not switched" label. This outlet provides a space where objects that need power all the time or more frequently than others can receive power even when the switch is off, preventing the need to have all outlets connected when just one is needed.

Although the AC and heating systems contain some controls that function sustainably regardless of occupant actions, residents are also encouraged towards certain curtailment behaviors that will create further energy savings through minimal use of artificial heating and cooling. Each dorm room and suite common room has a ceiling fan and one or more opening windows. This allows for cooling through natural ventilation and circulation, adequate as a substitute for air conditioning much of the time. The informational placards in these spaces emphasize this option by recommending opening windows, turning on fans, closing blinds, and making clothing changes before turning on the air conditioning.

Another design feature included in Pomona and Sontag Halls that has also been incorporated in many other residence halls at Pomona College are dual flush toilets. These

have two flush options: pushing the handle up is intended for liquid waste and uses significantly less water than pushing the handle down to flush solid waste. Although these toilets are designed to be efficient even when the larger flush is used, the overall water savings is dependent upon user cooperation.

The architecture of these buildings also incorporated a unique element that can be viewed as an efficiency behavior, but one whose success depends significantly on the level of occupant participation and the curtailment behaviors of residents. Thermal mass precast concrete was used as the foundation for all outside walls. These consist of 8-inch precast concrete with 3-inch polystyrene Styrofoam wedged in the middle.[31] During warm seasons the concrete absorbs cool air at night when temperatures are low and there is ventilation through the building. The high mass of the concrete creates a thermal lag, releasing the cool during the day. During colder seasons the concrete absorbs solar energy during the day, releasing it at night and warming the building.[32] This technology can stabilize interior temperature significantly, greatly minimizing the need for mechanical heating and cooling. However, particularly during the summer months, ventilation is necessary for cooling to be effective, and this requires resident participation through the opening of windows at night. Despite the heavy usage of signs and information in influencing resident behavior in these buildings, there is nothing that speaks specifically to opening windows at night and the additional advantages that this provides.

There were also technologies that were left out of the building designs, which, if implemented, would have increased the potential energy savings of the building resulting

[31] CTG Energetics, Inc. "100% Construction Document Phase Energy Analysis Report." Message to Steven Ehrlich Architects. 30 Nov 2009.
[32] CTG Energetics, Inc., . "Thermal Mass & Night Ventilation Strategy Discussion." Message to Steven Ehrlich Architects. 10 Oct 2008. E-mail.

from thermal mass insulation from four percent to seven percent.[33] Night flush, essentially the installation of giant fans that would flush warm air out of the building, simultaneously circulating cool air brought in through open windows and increasing the cool air stored thermal mass, making it more effective the following day and further decreasing the amount of energy needed for air conditioning.[34] However, in meetings held early on in the planning stages it was concluded by the architects and administration that the cost of installing this system and the work required to maintain it would not make up for the energy savings. This was primarily due to the belief that not enough students would do their part by opening windows at night.[35] This is an example of a situation in which more information on what behaviors students are and are not willing to adapt would be extremely helpful. Perhaps not including the night flush system was the right decision. The maintenance costs are high and without significant student participation the energy savings would be minimal. However, it is also possible that residents would have done their part, making the combination of thermal mass and night flush a successful sustainability measure. This provides us with a clear example of why further investigation into what feasible behavior expectations are is necessary.

Because of the variety of strategies used and the number of residents included, Pomona and Sontag Halls are an ideal canvas for further investigating the successes and failures of behavior related design. Pomona College students overall represent a community that is environmentally conscious and has shown awareness of sustainable lifestyles. A 2008 sustainability survey found that nearly three quarters of respondents

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[33] CTG Energetics, Inc., . "Thermal Mass & Night Ventilation Strategy Discussion." Message to Steven Ehrlich Architects. 10 Oct 2008. E-mail.
[34] *Ibid.*
[35] Oakley, Duke, architect for Pomona and Sontag Halls. Personal Interview. 06 Oct 2011.

were "concerned" or "very concerned" with environmental issues. Along with this the survey determined that more than 30% of Pomona students had taken classes focused on environmental issues – a number that has almost certainly increased in the last three years.[36] Based on previous research, this knowledge of and care for environmental issues suggests that that the Pomona community will be more likely to be willing to change their behavior in a positive way.[37] Because a significant portion of the population has already formed habits based on environmentally conscious practices, expanding upon these actions in a new setting will be less of a jump than if the study was conducted on a group that claimed little or no previous efforts to live sustainably. Also, since students are moving into a new location at the beginning of a new semester, many of their habits will be unformed, giving design features a greater chance of influencing behavior than if they were added to a preexisting environment. Therefore, using a community such as this to measure the effectiveness of behavior influencing design strategies will likely reflect the most positive results. This particular study will allow us to see which strategies seem to be most effective, which could be effective with some revisions, and which are unlikely to work at all or need to be dramatically changed. It is likely that if a tactic does not initiate behavioral changes or improvements in a community such as this it will not be effective in any situation.

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[36] Marcus, Benjamin J., and Rupu Guta. "2008 Claremont Colleges Sustainability Survey." *Claremont Colleges Sustainability Archive.* N.p., 2008. Web. <http://ccdl.libraries.claremont.edu/cdm4/item_viewer.php?CISOROOT=/csa&CISOPTR=604&CISOBOX=1&REC=1>.

[37] Abrahamse, Wokje. "A review of intervention studies aimed at household energy conservation." *Journal of Environmental Psychology.* 25.3 (2005): 273-291. Web. 10 Nov. 2011. <http://www.sciencedirect.com/science/article/pii/S027249440500054X>.

There are a few other circumstances that make Pomona students a unique group for a study such as this, which should be recognized as having potential impacts in the results. First of all, the college has approximately 1,560 students, making it a small, tight-knit community.[38] Pomona and Sontag Halls were also built with the intention of housing primarily upper classmen, with the majority of residents being seniors. The buildings are split into suites that range from three and six students, the majority of which have chosen to live together. The building design as a whole has a strong focus on community spaces. This combination of factors leads to the dorms having a very cohesive feel, meaning that community trends and peer pressure could have a significant impact on the success of design initiatives. Although the degree of this effect is impossible to measure, it is likely that due to Pomona students' overall environmentally conscious mindset these influences will be towards improving the sustainability of residents.

The setup of the suites also provides a unique opportunity to measure behavior changes between private and shared spaces. Each dorm room has its own air conditioning and heating controls, with a separate control for each suite's common room. Comparing the use of AC and heat between these two spaces will give further insight into how feelings of personal responsibility change behavior, as well as show if social pressures push actions in a particular direction in common spaces differently than in private rooms.

Conducting research on college students living in a dormitory also creates a unique circumstance in that residents do not pay for their water or electricity consumption. This eliminates economics from influencing occupant usage in one way or another. This also

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[38]"Quick Facts and Figures About Pomona." *Pomona College*. Web. 12 Nov 2011. <http://www.pomona.edu/about/facts-and-figures/facts-and-figures.asp&xgt;.

means that occupants do not receive regular statements reflecting their individual usage in unit amounts. Because of this, there is a pre-existing awareness gap between personal usage and quantitative data among many students that is much larger than what would be present in a typical household or apartment setting.[39] This could alter reactions to increased information, since any feedback on consumption levels would be a significant change. The absence of payments for energy and water consumption can also foster a lack of responsibility for consumption, since there is no direct consequence for using more. This means that any sustainable practices performed by Pomona students are motivated by something other than economic impacts. It is impossible to know whether green behaviors are then done out of habit, genuine concern for the environment, social pressures, or come from some other motivation. However, by comparing resident behaviors in the new dorms compared to their habits in previous on-campus living situations we can begin to determine what factors have the greatest influential potential.

To pinpoint answers to this question as well as several others that have arisen around behavioral architecture and design I conducted an extensive survey of dorm occupants. Getting feedback from people living in these spaces is the only way to determine what strategies are successful and when design features are not increasing sustainable behavior. There are several questions that the survey was targeted towards answering in order to gather as much information as possible on not only what strategies are and aren't working, but the causes of these successes or failures.

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[39] Stephenson, Janet, Barry Barton, Gerry Carrington, Daniel Gnoth, and Rob Lawson. " Energy cultures: A framework for understanding energy behaviours." Energy Policy. 38.10 (2010): 6120-6129. <http://www.sciencedirect.com/science/article/pii/S0301421510004611>.

The survey was sent to all residents of Pomona and Sontag Halls via email (see Appendix 1). It contained 45 questions, primarily focused on how each respondent was utilizing the specific design aspects directed at influencing occupant behavior. To more accurately determine whether the new dorms were the cause of particular behaviors there were also questions about how current habits compare to tendencies and usage in previous Pomona dorms. The survey's conclusion asked questions about respondents' environmental knowledge and behavior as well as their opinion of the dorms' greenness and likability. There were also a few questions about the use of community spaces, as much of the buildings' designs revolved around making shared spaces central to the function of the dorms. Because information from occupants is the most critical aspect of analyzing behavior, four randomly drawn ten-dollar gift cards were offered as incentive prizes to those who completed the survey.

Survey Results: Self Perceptions

Overall, 62 out of 150 residents completed the survey – just over 41%. These were fairly equally distributed between the two dorms, with 54.8% coming from Pomona Hall and 45.2% from Sontag Hall. 60 of the respondents were seniors and two were juniors, with no responses from underclassmen. This aligns well with the total distribution of residents in the dorms, as the vast majority of occupants are seniors. Although more responses to the survey would have been beneficial in determining behaviors across the dorms as a whole, I feel that there were enough responses to the survey to give an accurate depiction of how residents are behaving.

When analyzing the survey's results, the most complete information can be found by looking at occupant responses to individual questions as well as cross-referencing particular responses to get a more complete picture of how individual residents are behaving and what may be causing these behaviors. For example, looking at what each person who said they only turn on their power switch when they need to use the connected outlets also reported on their use of air conditioning will show us if students who are making sustainable decisions in one aspect of their behavior are doing so across the board. If this is the case, it could mean that the design of the new dorms is successful in all areas, that an external factor, such as a previous desire to behave sustainably, is responsible for resident decisions, or that the information contained within the dorms is responsible for educating residents on how to live efficiently within the buildings. Further insight into the cause of these behaviors could then be found by looking at how occupants who are making sustainable decisions view their knowledge of and care for sustainable issues by cross-referencing the answers they gave to the rating scale questions at the end of the survey.

Students' perceptions of the new dorms are generally very positive. When asked to rate how much they liked the new dorms on a scale from one to ten, nine was overwhelmingly the most popular response, coming from almost 50% of respondents (see Table 1). Only two people rated the dorms a five or below, and the average rating was an 8.7. Occupants also perceive the new dorms to be very green, with an eight being the most common answer when students were asked what their opinion was on this. Only six people gave rating of five or below, and 7.7 was the average response. This is compared to an average of 5.2 given to other Pomona dorms, where the most common response was five and more than half of survey participants gave ratings of five or less.

	Average	Mode	Range	# responding 5 or less
How happy are you with the new dorms?	8.7	9	3-10	2
How "green" would you say the new dorms are?	7.7	8	3-10	6
How "green" would you say Pomona dorms you've lived in in the past were?	5.3	5	2-9	38
How would you rate your overall effort to make sustainable decisions this year?	5.95	7	1-10	23
How would you rate your overall effort to make sustainable decisions in past years?	5.29	7	1-10	32
How environmentally conscious would you say you are?	6.59	7	2-10	15
How would you rate your knowledge of sustainable practices?	6.82	7	3-10	13

Table 1. Summary of survey results for 1-10 rating scales

Overall, there was a slight trend towards putting more effort into making sustainable decisions this year than they in the past, although a slight majority of respondents gave themselves the same rating for both questions. For those who said that they are putting in more effort in the new dorms (43.5% of the total) there was an average of a 1.8-point increase. Although only four people said that they have put less effort into living sustainably this year, this group averaged a two-point decrease. Overall respondents averaged 0.65-point increase in their efforts. Those who responded on extreme ends of the spectrum, tended to give the same answer for both questions (i.e. all respondents who rated their effort as either one or ten this year also gave themselves that rating for past

years), with most of the most dramatic changes in effort occurring in the middle of the spectrum. This suggests that students with extreme habits left their actions unaltered, while those who view their actions as moderate were more open to changes.

When asked how environmentally conscious they were, participants averaged a 6.59, with the most popular answer as seven and responses ranging from two to ten. Knowledge of sustainable practices also elicited seven as the most common answer, with an average of 6.82 and a range between three and ten. These results align fairly well with my expectations based on sustainability surveys done on Pomona's campus in the past, demonstrating a tendency toward awareness of sustainability issues but not leaning overwhelmingly in that direction. This supports my earlier conclusion that investigating the success of behavior-influencing design elements on sustainability in this environment will likely result in highlighting what has potential for effectiveness, as strategies are more likely to be successful in an environment that is pre-determined towards behaving efficiently.

When looking at the sustainability of the new dorms through the self-described behavior of residents, at a minimum it is clear that if the habits of occupants are changing from the past, these changes are for the better. It is also apparent that many individuals are leaving their habits unaltered despite design features in the dorms that are intended to change behaviors. When asked how electricity use in the new dorms compares to past use, 74.2% of respondents said they think about the same amount of electricity this year as they have before. The other 25.8% said they think they use less. Looking at this response in isolation suggests that overall design elements intending to lower electricity use have been moderately successful.

Because there are still a large percentage of residents that haven't responded to design features within the new dorms by lowering their electricity use, it is important to consider what prevented success within this segment. Out of the 62 respondents to the survey, 51.6% said that they "always" leave the power switch in their room on (see Table 2). All of these people also said that their electricity consumption this year is about the same as in the past. Reasonably, this group rated their effort to make sustainable decisions in the new dorms lower than the average response. 53% of those who reported leaving their power switch on all the time gave their current sustainable efforts a rating of five or less on a scale of one to ten, while only 37% of total respondents gave themselves such low ratings. This group also responded differently than the average resident in how they viewed their knowledge of sustainability and how conscious they are about sustainable issues. Those who left their switch on all the time reported having slightly lower levels of environmental consciousness and significantly less knowledge of how to live sustainably than the average new dorm resident. This group rated the new dorms an average of 7.28 in level of "greenness", while the average response from the total surveys was 7.78.[40] Although this difference may seem slight, the motivation behind the discrepancy in ratings could be significant.

Determining the true cause for this discrepancy in responses is difficult because it impossible to determine cause and effect without more information. However there are two likely causes for the differing opinions on the greenness of the new dorms among these

[40] "Green" was not defined in the survey and I intended for each respondent to apply their own meaning of it when answering the question. It was chosen over "efficient" and "sustainable" because each of these implies the need for more concrete or statistical knowledge of how the dorms are performing that would be unavailable to most students. Therefore green was chosen because of its general reference to environmentally friendly architecture.

two groups. One possibility is that the residents who don't see the dorms as being as sustainable – which could be due to their lack of knowledge about sustainability or any number of other factors – put less effort into enhancing that sustainability by adjusting their behavior. A second possibility for this difference is that those who do not use the switch think the buildings are less green because they have realized that they are not doing their part in saving additional electricity, while those who do use the outlet switches see the buildings as greener because they have noticed their own behavioral changes since living there. It is important to note that regardless of occupants' behavior within the new dorms, every respondent thought that Pomona and Sontag Halls were greener than dorms they have lived in previously.

	Respondents who reported their power switch is "always on"	Total Respondents
% rating their effort to live sustainably this year 1-5	53%	37%
Average rating for effort to live sustainably this year	5.03	5.95
Average environmental consciousness rating	6.09	6.59
Average knowledge of sustainable practices rating	6.42	6.82
Average rating of new dorms' "greenness"	7.28	7.78

Table 2. Comparison of survey results on 1-10 scales between total respondents and those who reported that their power switch is "always on"

However, use of the power switch in the new dorms does not necessarily mean that occupants are using less electricity than they have in the past. Unplugging outlets that are not in use would have the same effect as turning off a power switch when connected outlets are not needed; the switch just makes this energy saving behavior simpler. Respondents were asked how regularly they unplugged unused outlets in previous dorms. Overall,

occupants said that in the past they only occasionally unplugged outlets they were not using, if they did so at all. Even out of the group that answered extremely careful use of their power switches (only turning it on when they need to use connected outlets) only 30% reported frequently unplugging unused outlets in the past. This suggests that almost any use of the power switches is an improvement over energy use in the past. It is possible that more than 25.8% of occupants are using less electricity in the new dorms than they have in the past, even if these changes are slight enough to not be considered as creating electricity savings by the residents themselves.

When looking at the responses students gave it became very clear that many prioritize convenience when deciding whether or not to use their power switches. In a question asking what they plugged in to the outlet in the room that is not connected to the power switch (which was included in the rooms with the intention of allowing things like clocks to be plugged in constantly without prohibiting use of the power switch) and why, the most common responses by far were whatever is closest or most convenient, or "I don't plug anything into it/it's behind my bed", etc. Similarly, when asked what they plug into the outlets that are connected to the power switch many students responded with "everything" or "the same things I plug into the other switch." A surprising number of occupants (18%) also reported not having an independent outlet at all or not knowing the difference between the outlets that were and were not controlled by the switch. Whether the label identifying the independent switch was not included in some rooms, the switch itself was left out, or some students simply have not paid enough attention to discover this outlet is unclear. No matter what the cause of this problem, there is a lack of clarity in the information being received by students on the capabilities of energy savings within their

rooms, if not a deficiency in the design altogether. Although better understanding may not create behavioral changes in some residents, in others clearer information could be the difference between leaving their power switch on all the time and using it with more discretion.

Use of power switches in the new dorms is unique in the sense that they require enactment of an entirely new behavior. Measuring the use of air conditioning in these buildings looks instead at how people have adapted pre-existing behavior in a new environment. Because of all the efficiency measures that have already been included in the new dorms' air conditioning systems (automatic shut off if any windows are opened and limit of cooling to 76 degrees), there are only a few more actions occupants can take to improve efficiency of air conditioning use further.[41]

I found that the use of air conditioning reported in the survey was surprisingly low. In fact, almost half of those who responded said that they only use their air conditioning when it is much warmer outside than inside or that they do not use it at all (see Table 3). Less than 20% said that they leave their air conditioning on all the time (meaning that it would run only when the room is warmer than 76 degrees). Around 20% more said that they only have it on when it is warmer outside than inside or that they leave it on during the day but turn it off at night. A few people noted that they do not control their air conditioning or that they do not know how, again suggesting a disconnect in the information provided to residents.

[41] Because the survey was conducted in October and November of 2011, and occupants had only been living in the dorms since August of 2001 no questions were asked about use of the heating system.

Among those who reported leaving their air conditioning on all or most of the time, several also mentioned having difficulty figuring out how to control their thermostat, referencing lack of instructions or confusion with the system. Personally, I found the system difficult to control at first and noticed that no instructions were available on how to use it. I was able to learn to use it effectively after a few minutes of fiddling, but it did not come as a surprise when the survey uncovered several individuals who never put in that extra effort. Because there are already informational placards posted on the walls of common rooms and dorm rooms, most of which are located next to the thermostats, adding simple instructions on how the air conditioning functions and how it can be controlled could significantly improve occupant usage, allowing residents who have decided to leave their air conditioning on simply due to lack of understanding to only use it when necessary.

The survey also asked occupants which other options they utilized before turning on their air conditioning: turning on their fan, opening the windows, closing the blinds, or none of the above. Only four people reported not doing anything before using their air conditioning, all of whom also said they leave their air conditioning on all the time. 87% of people said that they turn their fan on, 52% said that they open their windows, and 37% reported closing their blinds to cool down the room before turning on the air conditioning.

Correlations between number of other options utilized before air conditioning and the amount of air conditioning used by each occupant aligned with my expectations. Those who turn their air conditioning on the least also reported using all three other options more than other groups, while occupants who leave their air conditioning on all the time usually only utilized their fan as a backup cooling source.

When occupants were asked how their use of air conditioning this year compares to the past (if they have had air conditioning in a past dorm – many of Pomona's dorms do not offer it) less than 5% said they use it more than in the past. 42% said they use less, and the rest said it was about the same or that they have not had the option before. When asked to describe what has caused their change in habits from past years, many occupants sited the addition of the fan as biggest source of reduction in their air conditioning use, with a few mentioning that turning on their fan and opening their windows was enough. Several residents also mentioned that their rooms this year do not get as hot as in the past, suggesting that better insulation was the cause and recognizing that this led them to use less air conditioning. These results show that occupants are much more likely to use air conditioning conservatively than electricity, as well as demonstrate that air conditioning use in the new dorms has improved much more than electricity use, at least in terms of occupant behavior.[42]

During the planning stages of the new dorms, the decision of whether or not to include night flush was controversial - depending largely on how much occupant participation could be expected through opening windows at night to increase ventilation. The energy model summary for the new dorms says that a 50% outdoor air ventilation rate (OA) is required to produce a 3% savings in building electricity, with 25% OA necessary to equal electricity use without night flush. Because significant air flow is necessary to fully cool the thermal mass, less than 25% OA rates do not produce energy savings.[43] Applying these rates to the behavior that has since been demonstrated by new dorm occupants

[42] This leaves out any electricity savings that come from the use of solar panels and other savings mechanisms and focuses only on the residents' perception of their use based on their own behavior.
[43] CTG Energetics, Inc., "Thermal Mass & Night Ventilation Strategy Discussion." Message to Steven Ehrlich Architects. 10 Oct 2008. E-mail.

suggests that night flush may have been effective, as air conditioning use rates are low and more than half of occupants reported opening their windows as an alternative form of cooling. However, because occupants are required to open their windows at night for the flush to be truly successful, more data would be needed to more accurately predict potential effectiveness.

In the survey occupants were asked to describe what controls the use of air conditioning in their common rooms as well as in their individual rooms. There is statistical significance in the differences in usage between these two areas. The data for use of air conditioning in common rooms seemed to be polarized on each end of the usage spectrum, something that did not occur in individual rooms. Leaving the air conditioning on all the time, and never having it on were by far the two most common responses when asked what best describes the use of air conditioning in common rooms. The third most popular response was "I don't know, someone else controls that." Overall almost 85% of responses fell into one of these three categories. Clearly behavior does differ between shared and private spaces in the new dorms, but whether these differences lead to more or less sustainable behavior is not consistent. It seems that in many cases occupants feel a lack of responsibility in shared spaces, or simply do not care enough to override a decision made by a suitemate when determining the use of air conditioning in common rooms. When most members of a suite use this sort of passivity, a decision made once can remain in effect for quite some time, which is demonstrated by the results of the survey. Circumstances like this make the temperature limits set on the air conditioning in the new dorms particularly successful. In the suites where resident passivity causes the air conditioning left on a majority of the time, the controls within the system will cause the air

conditioning to shut off when temperatures drop below 76 degrees, dramatically reducing energy wasted in excessive cooling.

	Always On	Only off when it is cool for >24 hrs	On when it is warmer outside	On when it is much warmer outside	On during the day, off at night	Never or rarely on	I don't know/ someone else controls it
Use of AC in dorm rooms	16.4%	3.3%	16.4%	24.6%	3.3%	23.0%	N/A
Use of AC in common rooms	23.0%	0.0%	19.7%	11.6%	1.6%	23.0%	18%

Table 3. Survey results on the use of air conditioning in dorm rooms and common rooms

The use of power switches in dorm rooms requires a conscious adoption of new behavior, as most occupants of the new dorms have not lived somewhere with this feature previously. Air conditioning use involves a combination of occupant behaviors with the efficiency settings already present in the dorms, many of which are also new to residents. Use of overhead light on the other hand is a behavior whose influences should remain relatively unchanged when living in Pomona and Sontag Halls. As in any residence, personal preferences and the amount of natural light available will influence the degree to which an occupant uses artificial light. Assuming that personal preferences remain relatively consistent year to year, the amount of natural light available in dorm rooms should be the primary factor in determining how residents' use of overhead light in the new dorms compares to their use in the past.

In general the architecture of the dorms was planned to include as many large windows as possible on outside walls. This was both because students and staff voiced preferences toward this style and to contribute more natural light, reducing the need for

artificial lighting.[44] However, because of the layout of the dorms' interiors, there is significant variation in the number of windows in each room, particularly within the four person suites, where two rooms have four to five windows each while the other two only have one (see Appendix 2). The layout in these two outside rooms is long and narrow, while the inside rooms with more windows are square. Combined, these factors provide much more daylight in the inside rooms and make the outside rooms much darker, even during the day.

In the survey residents were asked how many windows they have in their room, what direction their windows face, and how much of the time – during the day and when they are in their room – they have their overhead light on. The number of windows ranged from one to four and all windows face roughly to the north, south, east, or west. Overall the responses to the survey showed that occupants prefer not to use their overhead lights a majority of the time (see Table 4). The most common response when asked how often their overhead light was on was "rarely", which came from 31% of the participants. This was followed by "sometimes" from 26%, "usually" from 19%, "never" from 15%, and finally "always" from only 10% of respondents. The results also showed a slight correlation between the number of windows and the amount of artificial light occupants said that they use. Out of six respondents who said that their overhead light is "always" on when they are in their room, five had only one window. Similarly, out of twelve occupants who said they "usually" have their overhead light on when they are in their room, seven had only one window, three had two, and only two had more than three. This means that out of the eighteen people who reported using the most artificial light, two thirds have only one

[44] Oakley, Duke, architect for Pomona and Sontag Halls. Personal Interview. 06 Oct 2011.

window, which is significantly higher than the 40% of total respondents with one window. However, there were many respondents with one window who reported using overhead light "sometimes" or "rarely". It is clear that number of windows influences usage of artificial light but does not control it. There did not seem to be a correlation between the direction windows faced and the amount of artificial lighting used within dorm rooms.

	# of respondents	Overhead light "always" on	"Usually" on	"Sometimes" on	"Rarely" on	"Never" on
1 window	25	5	6	6	7	1
2 windows	16	0	3	7	4	2
3 windows	10	1	1	2	3	3
4 windows	10	0	1	1	5	3
Total	61	6	11	16	19	9

Table 4. Survey results of overhead light usage based on number of windows

Having fewer windows can cause occupants to use more lighting, but the survey showed less of connection between residents who have more windows and the use of less overhead light. Two thirds of those who reported never using their overhead light have three or more windows, but the number of windows in rooms that reported rarely using overhead light was fairly equally distributed from one to three, including only a few rooms with four or five windows. Rooms with more windows will by default allow in more natural light, decreasing the need to supplement it with artificial light, but it seems that for many occupants one or two windows allows in sufficient light to prevent the need to turn on their overhead light at least part of the time.

The survey helped to determine the lighting preferences of occupants and how this affects their use of overhead light by asking what affected their decision not to use their overhead light at certain times. The most popular response by far was because "the natural

daylight is sufficient," which was chosen by over 90% of respondents. Because multiple options could be selected, there were also 36% of respondents (twenty people) who said that they have a separate lamp or other light source, with 20% specifically saying that they prefer using another light source. 80% of occupants who said they have a separate light source also said that they would not use their overhead light when the natural light is sufficient. Assuming that this means they do not use a separate light source under these circumstances either, more than 75% of occupants reported using natural light over artificial when possible.

In the question which asked occupants how their use of overhead light this year compares to their use of it in the past, there was a significant leaning towards using less in the new dorms, with 39% of occupants answering that they felt they are using less overhead light this year. 48% of all respondents said that their light use was about equal, and the remaining segment reported that they use more overhead light. Because the survey also demonstrated that natural light is strongly preferred to artificial light, it seems that the inclusion of so much natural light in the new dorms is credible for the significant reductions on the amount of electrical light used by many occupants.

Utilization, or lack there of, of the dual flush feature on new dorm toilets presented some of the most encouraging results from the survey. In total, only seven occupants said that they never or rarely utilize the dual flush feature (10.5%), 37 said that they always use it (60.7%), twelve reported using it "sometimes" or "usually" (19.6%), and the remaining eight respondents (8.2%) said that their toilet was not equipped with a dual flush handle (see Table 7). Overall, these results show that dual flush toilets are quite successful in eliciting participation and therefore saving water. In fact, after laundry room habits, a 60%

success rate is the highest of any curtailment behavior I evaluated in the new dorms. Again, I would predict that this is mainly due to the simplicity of the behavior and the fact that it requires little alteration from previous habits.

	Always	Usually	Sometimes	Rarely	Never	Don't have one – N/A
% of occupants who utilize dual-flush	60.7%	18.0%	1.6%	4.9%	6.6%	8.2%

Table 7. Occupant use of dual-flush toilets

However, I think that it is important to include in this consideration that some suites are lacking dual flush handles in the first place, as this shows a discrepancy in the design process. Although the absence of dual-flush handles was limited to the smallest portion of respondents, this represents a group that is unable to utilize this efficiency feature at all. This is particularly harmful when it is occurring with something that has shown to be so successful, since the likelihood of the dual flush being utilized in these places if they were installed is high. There were also several comments from students that mentioned having the dual flush handle on their toilet, but being unsure if was working correctly. One occupant mentioned that the sticker marking which flush was which had been placed upside-down, causing their suite to by unsure about which direction to use for each intended flush. Another respondent simply said, "ours doesn't work", while a third reported not being able to tell a difference between the flushes, leading to uncertainty about whether it had been installed correctly. Although these may seem like minor mistakes, when combined with other problems such as the absence of outlets independent

from power switches and difficulty operating thermostats, they have an impact on the overall sustainability of the dorms. In the best case each of these toilets will simply use slightly more water than they would if installed correctly, but as a worst case scenario an accumulation of errors can lead occupants to dismiss sustainability measures altogether due to increased confusion on how to correctly utilize design features in their living space.

Survey Results: Reactions to Information

The way in which occupants respond to the efficiency information provided in the new dorms is critical because it has the potential to impact resident behavior in all systems examined by this study. Since the information provides suggestions on the most efficient ways to use air conditioning, lighting, and electricity, the degree to which occupants apply this information can significantly change their overall behavior. However, because this information is not the only variable involved in shaping sustainable behaviors of new dorm occupants, it can be difficult to determine exactly what impact information has in comparison to other influences described above.

The most basic statistic that measures whether the information included in the dorms is working as it was intended is the percentage of occupants who have read and remembered the information in their living spaces. Because determining the degree to which information has impacted behavior is much more complicated, instead considering how many residents have taken the time to pay attention to the information at all will help show its potential effectiveness. When asked in the survey whether or not they have read the information placard in their dorm room, 67.7% said that they had, 25.8% more said that they had skimmed it, while only 6.5% reported not reading it at all (see Table 5).

However, when asked if they remembered what the placard said, only 21% said that they did, while 59.7% said they "vaguely remembered the basic idea" (see Table 6). 12.9% who had read it or skimmed it did not remember what it said, in addition to the 6.5% that never read it at all, meaning that almost 20% of respondents had no lingering knowledge received from the informational placards in their room. Out of the occupants who reported both reading the placard and remembering the information it contained, eleven said that they had taken the information into consideration when making decisions on they energy use, and 26 more said that the information had "maybe" effected their decisions. Only nine reported that they had not taken the information into consideration, and sixteen said that they had not read it in or did not remember enough to utilize the information (see Table 6).

These results are encouraging in the sense that they show a significant majority of students responding positively to the information. However, to get a better idea of the potential positive behavioral changes that the informational placards are contributing to, I compared the air conditioning and overhead light usage habits of those who reported using the information contained on the placards with those who had paid less attention to the information. This produced very surprising results. Those who reported leaving their air conditioning on all the time and those who left their overhead lights on all the time or most of the time also had higher rates of reading and remembering the information on the placards than the group as a whole. One third of those with the highest air conditioning usage and 27.8% of the group who used their overhead lights the most said that they had read and remembered the information in their rooms, while only 21% of the total respondents said this. On top of this, a quarter of the people with high air conditioning use said they have taken the information into consideration when making decisions, which is

higher than the 17.7% of total respondents who reported applying the information to their behavior.

Perhaps even more surprisingly, those who reported the lowest use of their air conditioning tended to remember the least about the information in their rooms. One third of the residents who reported using their air conditioning rarely or not at all also said they never read or don't remember the information contained on their placard. In addition, every occupant who said that they never read their placard in the first place fell into this category of low air conditioning use. The rest of the responses were distributed fairly evenly, with no significant correlations between behavior and the degree to which occupants read and applied the information in their rooms. My first prediction to explain these unexpected results was, perhaps occupants who already had knowledge on how to behave sustainably did not read or apply the information in their rooms because they felt they had nothing to learn from it. To investigate this I looked at how the respondents who had never read or did not apply the information on their placards had rated their own knowledge of sustainable practices. However, these responses ranged from three to ten, with an average response of a 6.82, which is one tenth of a point lower than the average response from the survey as a whole. Ratings on effort to make sustainable decisions in the dorms were also incredibly similar between this group and the results as a whole, coming out to 5.9 and 5.95 respectively. Because these numbers are so similar, the survey does not seem to provide an explanation for the unexpected correlation showing that paying more attention to the informational placards in dorm rooms leads to less efficient energy behaviors and vice versa.

The survey also collected information on how occupants reacted to the information present in common rooms, allowing a comparison to be made between the effectiveness of information provided in private spaces and shared areas. The number of people who had never read the information was slightly higher in common rooms than in dorm rooms, with 9.7% responding this way over only 6.5% in individual rooms. The percentage of occupants who said that they had taken the information from the common room placard into consideration was similarly low at 9.7%, eight percent lower than the 17.7% who responded this way for the information in their own rooms. All of the people who said their behavior had been influenced by the information in their common room also reported taking the information in their own room into consideration. Not surprisingly, people seem to be more attentive to information contained in their private space than they are to that in a shared area.

These results are further emphasized by occupants' reactions to the information posted in the laundry rooms of the new dorms on how to save energy and water. 45.2% of survey respondents said that they had not read this information at all, 35.5% said that they had skimmed it, and only 19.4% reported actually reading it. Although these numbers are likely influenced by the fact that the laundry rooms are public space, occupants also generally spend much less time in the laundry room than they do in their own common room and dorm room, further decreasing the likelihood that residents have read these suggestions. However, out of the residents who read or skimmed the information, a quarter said that they have utilized the information, which is higher than in any of the previous categories. This could be because the signs offer many suggestions on how to save water and energy while doing laundry, many of which are simple to adapt.

	Read it	Skimmed it	Didn't read
Info in dorm room	67.2%	26.2%	6.6%
Info in common room	54.1%	36.1%	9.8%
Info in laundry room	19.7%	36.1%	44.3%

Table 5. Occupant responses to information in various areas of the new dorms

	Read & Remember	Read & vaguely remember	Read and have "maybe" applied	Read and have applied
Info in dorm room	21.3%	59.0%	41.0%	18.0%
Info in common room	14.8%	60.7%	50.8%	9.8%
Info in laundry room	9.8%	31.1%	23.0%	13.1%

Table 6. Occupant responses to information in various areas of the new dorms continued

Although the number of people who reported reading the information in the laundry rooms was very low, the overall laundry-related curtailment behaviors of survey respondents were quite impressive. Respondents were asked which of several actions they take when doing laundry this year, and which they utilized in the past. Not a single respondent said that they didn't do at least one of the options, and most reported doing two or more. The most common efficiency behavior was always doing full loads (90.2%), followed by cleaning the lint screen (83.6%), using cold water for washing (73.7%), using less detergent (44.3%), and finally using drying racks instead of the dryers (13.1%). All of these statistics were higher than how residents reported their behavior in previous years except for doing full loads, which fell by three percent, and cleaning the lint screen, which remained the same.

Overall, the best habits belonged to occupants who also reported reading the information provided in the laundry room, although the degree to which this improved behavior varied significantly between options. Respondents were also asked what

influenced any changes in laundry room behavior occurring this year. 77% of people said that their habits had not changed. The most common response among those who had changed their habits was the availability of new options on the machines in the laundry room (13.1%). These include buttons to select water temperature on the washers, making using in cold water simple. Information posted in the laundry room was selected as influencing changes in behavior by only four people (6.6%). 15 out the 22 occupants who had read the information in the laundry rooms and might or would consider it when making decisions reported no changes in their own behavior this year. This data suggests that the high percentages of students who said that they would consider utilizing the information they read in the laundry rooms is artificially high. However, because the habits of those who read the information tend to be significantly better than others, it is possible that the posted suggestions are having a greater impact than occupants realize. Regardless of how residents alter their behavior, they seem to be more open to considering the information in the laundry rooms than in their common rooms or dorm room.

In this case it seems that, when read, the information in the laundry rooms can be more beneficial in positively affecting occupants' sustainability habits than information in any other location. I believe that this is influenced by two main factors. First of all, the information in the laundry rooms provides occupants with several options that they can take, all of which will improve sustainability. In addition, success is increased by the ease with which many of these changes can be made. Using cold water instead of hot simply involves pushing a button, doing full loads is not only simple, but also saves occupants time and money (each load in the washer is one dollar and dryer loads are fifty cents each). Not only are many of the actions simple, but they require action to be taken less frequently than

other behavior adaptations measured in the survey. Most college students do laundry only a few times a month (if that often), making it much easier to have consistently positive behavior when doing laundry than with actions that are required several times a day. Switching from using dryers to drying racks is the sustainability measure practiced by the fewest number of occupants, which aligns well with the idea that convenience is the factor with the biggest influence on habit changes, as this takes much more time and effort than any of the other efficiency behaviors. This also suggests that money is not a significant influence on laundry habits, particularly if saving money involves increasing effort.

Recommendations and Conclusions

Based on occupant descriptions of their own habits, it is clear that Pomona and Sontag Halls have created improvements in residents' sustainability behavior. In particular, the abundance of natural light in many rooms has caused occupants to use less artificial lighting, and the inclusion of dual flush toilets has been met with high levels of participation. The fact that the average resident reported increasing their effort to make sustainable decisions by 0.65-points is also a very significant indicator of overall success, particularly when looking exclusively at the behavior of occupants. The dorms are viewed by students as being much greener than other residence halls on campus, and student opinions of the dorms are overwhelmingly positive, factoring in to the idea that they are successful both as living spaces and as a positive contribution to the green building movement.

Although acknowledging the successes of the dorms is important, realizing their setbacks is even more critical in improving future projects and continuing forward

progress in sustainable building both on Pomona's campus and in the broader community. One of the biggest themes that emerged from this research was that people are much more likely to change their habits if these alterations are simple. This was a factor for all successful design and architectural elements of the dorms, such as natural light, available options on washers and dryers, and dual flush toilets, but lack of simplicity was also exposed as a contributor to strategies that were not as effective.

This was most clearly demonstrated by the mediocre response occupants have had to the power switches. Although the switches seem like a simple and easy way to save electricity, especially compared to disconnecting individual outlets, the way in which they have been incorporated into room design has made it difficult for some occupants to utilize them correctly, leading to a majority disregarding them entirely. A lack of clarity in identifying outlets that are independent from the switch is responsible for some of this problem. For occupants who have been able to identify their independent outlet, the location is often to blame for lack of utilization. Clocks, some chargers, and other various items must be connected to an electrical source at all times to remain effective, and if an independent outlet is not available where these things must be plugged in many residents have resolved the issue by leaving all their outlets on all the time, preventing additional energy savings. It is also important to remember that this is no different than leaving unused items plugged in in previous dorm rooms, and that leaving the power switch on at all times only prevents energy savings, but does not consume more energy than would be used under ordinary circumstances.

However, the intention of the new dorms and the incorporation of behavior impacting design is not to match the energy consumed by ordinary buildings, but to create

an environment in which occupants make more efficient decisions. Because of this I feel that there are improvements that could be made that could increase the future success of the power switches. Including more than one independent outlet, spaced in opposite parts of each dorm room, is one possibility. This may seem counterintuitive in that it increases the number of spaces in which things can be plugged in and left without the option of shutting off power connection. However, it will also increase the likelihood that these outlets are located where they need to be in order to be correctly utilized by occupants, thereby allowing the rest of the outlets to be used for things that can be turned off using the power switch and overall improving efficiency. 47% of survey participants who answered the question asking what determined what they plugged into their independent outlet sited location or convenience as the primary factor. 43% seemed to make the decision of what they plugged into this outlet consciously, usually basing it on what they used most frequently or what needed to stay on all the time. By making independent outlets more convenient, the number of occupants making these conscious decisions would increase. Power switches have the potential to be a simple and easy way of reducing electricity consumption, but the study has revealed that this has not yet been accomplished in the new dorms. I believe that if their incorporation into building design can be adapted to make their use as convenient as possible for residents, power switches can become effective, but for now they are only being utilized by a select group of students.

Judging by student reactions, the information provided in the dorms seems to be moderately successful at best. Even though most occupants report having read the information in their rooms and common rooms and a fair number at least consider applying that information to their habits, these changes were not displayed in the survey

results. I believe that part of this is due to the elementary nature of some of the information contained on the placards. Because the average new dorm resident already views them self as having substantial knowledge of sustainable practices, the basic suggestions contained in the suites does not add to their knowledge base, and therefore does not impact their behavior. If occupants have not yet adopted the practices of turning off lights when they leave a room or taking off a sweatshirt instead of turning on the air conditioning, it is unlikely that these habits will be developed because of the information posted in their room. A few respondents articulated their opinions on this in the survey, calling the information "common sense" or stating that they had already known everything the placards contained. The tone of these responses was defensive, implying that the authors had dismissed what was written on the placards because it could not teach them anything new. Triggering dismissive reactions like this is not productive in improving occupant behavior. It seems that some of what is posted in Pomona and Sontag Halls may be too basic for the average occupant.

Information that is helpful to residents is that which contains suggestions or facts unique to living in these buildings. There is a bit of this contained on the placards, including the brief description of what the power switches do and instructions on how to identify the outlet that operates independently. There is also data in the common rooms that informs occupants that many of the construction materials and furniture in the dorms are made from recycled materials. Both of these are specific to Pomona and Sontag Halls, making occupants more likely to take the information seriously.

There are a two more pieces of information that I feel would greatly improve the overall content of the placards. First, there should be instructions on how to correctly and

more easily operate the thermostats. Lack of understanding of the air conditioning system has caused many occupants to leave their air conditioning on all the time. Simple instructions are all that is needed to cause significant improvements in behavior. Second, the capabilities of thermal mass and its use in the dorms should be described to students. Although the technicalities are not necessary, occupants should be informed of the capabilities of the insulation systems as well as instructed on the most effective way to utilize its benefits. This should include a brief statement on the daytime cooling that can be received by opening windows at night. Unlike one more repetitive sign asking occupants to conserve water, specific, applicable information such as this will show students something new that they can do to improve their own living conditions and live more sustainably.

In regards to the air conditioning in the new dorms, most occupants seem to be behaving fairly sustainably, with many of their habits reflecting positive changes based on design measures taken in the dorms, particularly the addition of ceiling fans. For those students who have not been as careful in limiting their air conditioning use, the efficiency behaviors taken by the school in the design and architecture processes seem to be extremely effective. Wasted energy on cooling is limited by automatic shut off and a 76-degree temperature limit, creating significant benefits in the twelve rooms that reported leaving their air conditioning on a majority of the time. These benefits become even more critical in common rooms, which the survey revealed as eliciting more passive behavior than individual dorm rooms. In these spaces the efficiency behaviors incorporated into the air conditioning system save even more, as 23% of suites reported leaving theirs on all the time.

In the end, Pomona and Sontag Halls should be recognized for their progressive incorporation of behavior-influencing design and architectural features, including many strategies that have not been widely used before. Because the previous research on many of these elements is minimal, their incorporation into the dorms was risky, and in many ways can be seen as an experiment, the results of which have highlighted some successes as well as illuminated a few failures. Most importantly, these dorms can teach Pomona and the broader community improvements that can be made in the future. Viewing these dorms as a learning tool in sustainable building and not as an isolated project makes them a success despite an imperfect report card.

Appendix One. Survey questions and results

Morgan

SurveyMonkey

1. Which dorm do you live in now?

	Response Percent	Response Count
Pomona Hall	**55.7%**	**34**
Sontag Hall	44.3%	27
	answered question	**61**
	skipped question	**0**

2. What year are you?

	Response Percent	Response Count
Senior	**96.7%**	**59**
Junior	3.3%	2
Sophomore	0.0%	0
	answered question	**61**
	skipped question	**0**

3. Where did you live as a first year?

	Response Percent	Response Count
Mudd/Blaisdell	**37.7%**	**23**
Harwood	31.1%	19
Lyon	8.2%	5
Wig	21.3%	13
Gibson	0.0%	0
Transfer Student	1.6%	1
Other (please specify)	0.0%	0
	answered question	**61**
	skipped question	**0**

4. Where did you live as a sophomore? (If applicable)

	Response Percent	Response Count
Mudd/Blaisdell	**31.1%**	**19**
Harwood	16.4%	10
Lyon	4.9%	3
Wig	8.2%	5
Gibson	1.6%	1
Oldenborg	27.9%	17
Smiley	6.6%	4
Walker	3.3%	2
Clark 1	0.0%	0
Clark 3/Norton Clark	0.0%	0
Clark 5	0.0%	0
Lawry	0.0%	0
Off Campus	3.3%	2
Transfer Student	0.0%	0
Other (please specify)	3.3%	2
	answered question	**61**
	skipped question	**0**

5. Where did you live as a junior? (If applicable)

	Response Percent	Response Count
Mudd/Blaisdell	10.2%	6
Harwood	8.5%	5
Lyon	0.0%	0
Wig	1.7%	1
Gibson	0.0%	0
Oldenborg	5.1%	3
Smiley	15.3%	9
Walker	**30.5%**	**18**
Clark 1	15.3%	9
Clark 3/Norton Clark	15.3%	9
Clark 5	1.7%	1
Lawry	3.4%	2
Off Campus	1.7%	1
Transfer Student	0.0%	0
Other (please specify)	6.8%	4
	answered question	**59**
	skipped question	**2**

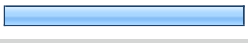
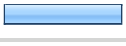
6. Does your room have an outlet that is not connected to the on/off switch?

	Response Percent	Response Count
Yes	**82.0%**	**50**
No	3.3%	2
Not sure	14.8%	9
answered question		**61**
skipped question		**0**

7. If yes, what do you typically use this outlet for and why?ex: convenience of location (because it isn't stuck behind my desk), items used most frequently, whatever I happened to plug in it, etc.

	Response Count
	49
answered question	**49**
skipped question	**12**

8. How often do you leave your on/off switch in the "on" position?

		Response Percent	Response Count
Always		**50.8%**	**31**
Almost always		24.6%	15
Anytime I'm in my room		6.6%	4
Most of the time I'm in my room		3.3%	2
Only when I need to use the connected outlets		14.8%	9
		Comments	11
		answered question	**61**
		skipped question	**0**

9. What do you typically have plugged in to the outlets that ARE connected to the on/off switch?

	Response Count
	55
answered question	**55**
skipped question	**6**

10. Before living in the new dorms, how frequently did you unplug outlets that were not being used?

	Response Percent	Response Count
Almost always	4.9%	3
Usually	4.9%	3
Sometimes	9.8%	6
Occasionally (Maybe when I left for Spring Break)	**50.8%**	**31**
Never	29.5%	18
	Comments	2
	answered question	**61**
	skipped question	**0**

11. How do you think having an outlet control switch has changed your overall electricity consumption?

	Response Percent	Response Count
I use more electricity than I did before	0.0%	0
I use about the same amount as before	**73.8%**	**45**
I use less electricity than I did before	26.2%	16
	Comments	3
	answered question	**61**
	skipped question	**0**

12. How many windows are in your room?

	Response Count
	61
answered question	**61**
skipped question	**0**

13. What direction do your windows face?

		Response Percent	Response Count
North		27.9%	17
South		16.4%	10
East		**42.6%**	**26**
West		32.8%	20
Other (please specify)		1.6%	1
	answered question		**61**
	skipped question		**0**

14. How often (during the day and when you are in your room) do you use your overhead light?

	Response Percent	Response Count
Always	9.8%	6
Usually	18.0%	11
Sometimes	26.2%	16
Rarely	**31.1%**	**19**
Never	14.8%	9
	Comments	5
	answered question	**61**
	skipped question	**0**

15. When/if you do not use your overhead light is it because:

	Response Percent	Response Count
You have a separate lamp or other light source	36.4%	20
The natural daylight is sufficient	**90.9%**	**50**
Your prefer other light sources	20.0%	11
Other (please specify)	9.1%	5
	answered question	**55**
	skipped question	**6**

16. How does your use of artificial lighting this year compare to your use in past years at Pomona?

	Response Percent	Response Count
I use more artificial lighting (i.e. all of the lights)	13.1%	8
I use about the same amount	**47.5%**	**29**
I use less artificial lighting	39.3%	24
	Comments	8
	answered question	**61**
	skipped question	**0**

17. What would you say best determines your use of your air conditioning?

	Response Percent	Response Count
My AC is always on	16.4%	10
On when it seems to be warmer outside than inside	16.4%	10
On when it seems to be much warmer outside than inside	**24.6%**	**15**
On during the day but off at night	3.3%	2
Only off when it seems to be cool for an extended period of time (more than 24 hours of cooler temperatures outside than inside)	3.3%	2
Never or rarely on	23.0%	14
Other (please specify)	13.1%	8
	answered question	**61**
	skipped question	**0**

18. Which of the following options would you say you do before turning on your air conditioning?

	Response Percent	Response Count
Open windows	50.8%	31
Close blinds	36.1%	22
Turn on fan	**86.9%**	**53**
None of the above	6.6%	4
	Comments	4
	answered question	**61**
	skipped question	**0**

19. How often do you use your fan and AC together?

	Response Percent	Response Count
My fan is always on when my AC is on	**42.6%**	**26**
My fan is often on when my AC is on	31.1%	19
I rarely use them at the same time	19.7%	12
I never use them at the same time	6.6%	4
	Comments	3
	answered question	**61**
	skipped question	**0**

20. What is the use of the AC in your common room?

		Response Percent	Response Count
The AC in our common room is almost always on		**23.0%**	**14**
On when it seems to be warmer outside than inside		19.7%	12
On when it seems to be much warmer outside than inside		11.5%	7
On during the day but off at night		1.6%	1
Only off when it seems to be cool for an extended period of time (more than 24 hours of cooler temperatures outside than inside)		0.0%	0
Never or rarely on		**23.0%**	**14**
I don't pay attention - someone else controls that		18.0%	11
Other (please specify)		3.3%	2
		answered question	**61**
		skipped question	**0**

21. If you have had AC in a Pomona dorm room in the past, how would you say your use this year compares to past years?

	Response Percent	Response Count
I use it more this year	4.9%	3
I use it about the same amount	29.5%	18
I use it less this year	**42.6%**	**26**
I haven't had AC in the past	23.0%	14
	Comment	4
	answered question	**61**
	skipped question	**0**

22. If your usage has changed, why do you think this is? (Addition of a fan, improved ventilation, increased information on AC use, etc.)

	Response Count
	26
answered question	**26**

23. Have you read the placard on green living in your room?

	Response Percent	Response Count
Yes	**67.2%**	**41**
Maybe skimmed it a little	26.2%	16
No	6.6%	4
Comments		2
answered question		**61**
skipped question		**0**

24. Do you remember what the placard in your room says? (No peeking)

	Response Percent	Response Count
Yes	21.3%	13
No	13.1%	8
Vaguely remember the basic idea	**59.0%**	**36**
No, because I never read it in the first place	6.6%	4
Comments		1
answered question		**61**
skipped question		**0**

25. If you read it AND remember what it says, have you taken the information into consideration when making decisions on your energy use?

	Response Percent	Response Count
Yes	18.0%	11
Maybe a little	**41.0%**	**25**
No	14.8%	9
Never read it/don't remember/don't care	26.2%	16
	Comments	2
	answered question	**61**
	skipped question	**0**

26. Have you read the information placards in your common room?

	Response Percent	Response Count
Yes	**54.1%**	**33**
Maybe skimmed them a little	36.1%	22
No	9.8%	6
	Comments	0
	answered question	**61**
	skipped question	**0**

25. If you read it AND remember what it says, have you taken the information into consideration when making decisions on your energy use?

	Response Percent	Response Count
Yes	18.0%	11
Maybe a little	**41.0%**	**25**
No	14.8%	9
Never read it/don't remember/don't care	26.2%	16
	Comments	2
	answered question	**61**
	skipped question	**0**

26. Have you read the information placards in your common room?

	Response Percent	Response Count
Yes	**54.1%**	**33**
Maybe skimmed them a little	36.1%	22
No	9.8%	6
	Comments	0
	answered question	**61**
	skipped question	**0**

27. Do you remember what the placards in your common room say?

	Response Percent	Response Count
Yes	14.8%	9
No	14.8%	9
Vaguely remember the basic idea	**60.7%**	**37**
No, because I never read them in the first place	9.8%	6
	Comments	0
	answered question	**61**
	skipped question	**0**

28. If you read them AND remember what they say, have you taken the information into consideration when making decisions on your energy use?

	Response Percent	Response Count
Yes	9.8%	6
Maybe a little	**50.8%**	**31**
No	11.5%	7
Never read them/don't remember/don't care	27.9%	17
	Comments	0
	answered question	**61**
	skipped question	**0**

29. Have you read the information provided in the laundry room?

	Response Percent	Response Count
Yes	19.7%	12
Skimmed it while I was waiting for the dryer to finish	36.1%	22
No	**44.3%**	**27**
	Comments	0
	answered question	**61**
	skipped question	**0**

30. Do you remember what the signs in the laundry room say?

	Response Percent	Response Count
Yes	9.8%	6
No	27.9%	17
Vaguely remember the basic idea	**31.1%**	**19**
No, because I never read them in the first place	**31.1%**	**19**
	Comments	1
	answered question	**61**
	skipped question	**0**

31. If you read them AND remember what they say, have you taken the information into consideration when making decisions on your energy use?

	Response Percent	Response Count
Yes	13.1%	8
Maybe a little	23.0%	14
No	6.6%	4
Never read them/don't remember/don't care	**57.4%**	**35**
	Comments	3
	answered question	**61**
	skipped question	**0**

32. When doing laundry, which of the following did you do regularly prior to this year?

	Response Percent	Response Count
Use cold water for washing clothes	67.2%	41
Do only full loads	**93.4%**	**57**
Use a drying rack instead of the dryers	11.5%	7
Use less detergent	36.1%	22
Clean the lint screen on the dryer before use	83.6%	51
None of the above	0.0%	0
	Comments	1
	answered question	**61**
	skipped question	**0**

33. Which of the following do you do regularly this year?

	Response Percent	Response Count
Use cold water to wash clothes	73.8%	45
Do only full loads	**90.2%**	**55**
Use a drying rack instead of the dryers	13.1%	8
Use less detergent	44.3%	27
Clean the lint screen on the dryer before use	83.6%	51
None of the above	0.0%	0
	Comments	4
	answered question	**61**
	skipped question	**0**

34. If your habits have changes, what would you say caused these changes?

	Response Percent	Response Count
Information on signs within the laundry room	6.6%	4
Information received from another source	1.6%	1
Options available with the new dorm washers and dryers	13.1%	8
My habits have not changed	**77.0%**	**47**
Other (please specify)	3.3%	2
	answered question	**61**
	skipped question	**0**

35. Is your toilet dual-flush? (Does it have the "up for 'number one' down for 'number two'" option)

	Response Percent	Response Count
Yes	**91.8%**	**56**
No	8.2%	5
Not sure	0.0%	0
	answered question	**61**
	skipped question	**0**

36. Do you make use of the dual-flush feature?

	Response Percent	Response Count
Always	**60.7%**	**37**
Usually	18.0%	11
Sometimes	1.6%	1
Rarely	4.9%	3
Never/I don't trust it	6.6%	4
We don't have one	8.2%	5
	Comments	8
	answered question	**61**
	skipped question	**0**

37. How often do you use the common areas and/or kitchen on your floor?

	Response Percent	Response Count
Multiple times a week	19.7%	12
Once a week or so	**27.9%**	**17**
A couple times a month	21.3%	13
Once or twice this semester	**27.9%**	**17**
Never	3.3%	2
	Comments	0
	answered question	**61**
	skipped question	**0**

38. What do you use these spaces for?

	Response Percent	Response Count
Studying	**60.7%**	**37**
TV	8.2%	5
Cooking	57.4%	35
Social reasons	52.5%	32
I don't use them	1.6%	1
Other (please specify)	3.3%	2
	answered question	**61**
	skipped question	**0**

39. How often do you use the main common room and/or kitchen on the first floor?

	Response Percent	Response Count
Multiple times a week	0.0%	0
Once a week or so	13.1%	8
A couple times a month	9.8%	6
Once or twice this semester	34.4%	21
Never	**42.6%**	**26**
	Comments	1
	answered question	**61**
	skipped question	**0**

40. What do you commonly use this space for?

	Response Percent	Response Count
Studying	24.6%	15
Use of the projector	18.0%	11
Cooking	19.7%	12
Social reasons	26.2%	16
I don't use it	**42.6%**	**26**
Other (please specify)	1.6%	1
	answered question	**61**
	skipped question	**0**

41. How often did you use common spaces (study rooms, kitchens, living rooms, etc) in dorms you've lived in in past years?

	Response Percent	Response Count
Multiple times a week	9.8%	6
Once a week or so	16.4%	10
A couple times a month	**29.5%**	**18**
Once or twice a semester	**29.5%**	**18**
Never	14.8%	9
	Comments	0
	answered question	**61**
	skipped question	**0**

42. Please rate the following on a scale of one to ten, with 1 being not at all and 10 being extremely

	1	2	3	4	5	6	7	8	9	10	Response Count
In general, how happy would you say you are with the new dorms?	0.0% (0)	0.0% (0)	1.6% (1)	1.6% (1)	0.0% (0)	3.3% (2)	4.9% (3)	16.4% (10)	**49.2% (30)**	23.0% (14)	61
In your opinion, how "green" would you say the new dorms are?	0.0% (0)	0.0% (0)	1.6% (1)	1.6% (1)	6.6% (4)	6.6% (4)	21.3% (13)	**29.5% (18)**	19.7% (12)	13.1% (8)	61
In your opinion, how "green" would you say Pomona dorms you've lived in in past years were?	0.0% (0)	1.6% (1)	8.2% (5)	16.4% (10)	**36.1% (22)**	21.3% (13)	9.8% (6)	4.9% (3)	1.6% (1)	0.0% (0)	61
										answered question	**61**
										skipped question	**0**

43. Please rate the following on a scale from one to ten, with 1 being no effort, and 10 being as much effort as possible

	1	2	3	4	5	6	7	8	9	10	Response Count
How would you rate your overall effort to make sustainable decisions while living in the new dorms?	1.6% (1)	4.9% (3)	11.5% (7)	13.1% (8)	6.6% (4)	14.8% (9)	**19.7% (12)**	14.8% (9)	11.5% (7)	1.6% (1)	61
How would you rate your overall effort to make sustainable decisions in your dorms in past years?	3.3% (2)	8.2% (5)	8.2% (5)	14.8% (9)	18.0% (11)	16.4% (10)	**19.7% (12)**	4.9% (3)	4.9% (3)	1.6% (1)	61
										answered question	**61**
										skipped question	**0**

44. Please rate the following on a scale of one to ten, with 1 being not at all and 10 being very

	1	2	3	4	5	6	7	8	9	10	Response Count
How environmentally conscious would you say you are?	0.0% (0)	1.6% (1)	6.6% (4)	4.9% (3)	11.5% (7)	14.8% (9)	**32.8% (20)**	14.8% (9)	8.2% (5)	4.9% (3)	61
										answered question	**61**
										skipped question	**0**

45. Please rate the following on a scale from one to ten, with 1 being no knowledge and 10 being SO MUCH KNOWLEDGE

	1	2	3	4	5	6	7	8	9	10	Response Count
How would you rate your knowledge of sustainable practices?	0.0% (0)	0.0% (0)	1.6% (1)	3.3% (2)	16.4% (10)	21.3% (13)	**23.0% (14)**	19.7% (12)	11.5% (7)	3.3% (2)	61
										answered question	**61**
										skipped question	**0**

Page 2, Q7. If yes, what do you typically use this outlet for and why? ex: convenience of location (because it isn't stuck behind my desk), items used most frequently, whatever I happened to plug in it, etc.		
1	I dont use the on/off switch	Nov 7, 2011 7:00 PM
2	My alarm clock so it doesn't turn off.	Nov 7, 2011 4:31 PM
3	Convenience of location	Nov 6, 2011 6:57 PM
4	bedside light and clock	Nov 6, 2011 4:30 PM
5	nothing—it's not near anything	Nov 4, 2011 1:59 PM
6	whatever is closest	Nov 4, 2011 11:29 AM
7	I use this one for items that are used most frequently, and that I don't want to turn off (like my clock)	Nov 4, 2011 1:31 AM
8	I dont even know which one it is	Nov 4, 2011 12:35 AM
9	Alarm clock, lamp. I use this because my alarm clock needs to stay powered, and the outlet is behind my bed, so the placement is convenient.	Nov 3, 2011 11:01 PM
10	Convenience location.	Nov 3, 2011 7:58 PM
11	whatever i happened to plug in it	Nov 3, 2011 7:27 PM
12	my clock, because I like it having power all the time. also sometimes the bedlamp, for convenience of location	Nov 3, 2011 7:20 PM
13	The same as all the other outlets	Nov 3, 2011 5:56 PM
14	surge protector for electronics - for charging etc.	Nov 3, 2011 5:05 PM
15	computer plug and phone charger. Convenient to have them always charging	Nov 3, 2011 4:46 PM
16	Clock, computer, phone charger. Because of location and I want these items alway on.	Nov 3, 2011 4:12 PM
17	Do not use it because of location	Nov 3, 2011 3:38 PM
18	I don't use it, it's behind my bed.	Nov 3, 2011 2:59 PM
19	Where my speakers and comp are plugged in thug.	Nov 3, 2011 2:58 PM
20	convenience of location, whatever I happened to plug in	Nov 3, 2011 2:45 PM
21	I use this outlet for my alarm clock and to charge my computer since I need these things to always be on.	Nov 3, 2011 2:38 PM
22	Inconveniently located behind bed, used for alarm clock and floor lamp (things that are more useful turned on all the time).	Nov 3, 2011 2:05 PM
23	It's the outlet closest to my desk, so I use it to charge my laptop and my alarm clock.	Nov 3, 2011 2:03 PM

Page 2, Q7. If yes, what do you typically use this outlet for and why? ex: convenience of location (because it isn't stuck behind my desk), items used most frequently, whatever I happened to plug in it, etc.		
24	extension cord for access to it, it's behind my bed. Fan, cell phone charger, and 2 alarm clocks	Nov 3, 2011 2:02 PM
25	bedlamp	Nov 3, 2011 1:55 PM
26	I plug almost everything into this outlet, especially things I always want powered, such as alarm clock, computer, etc.	Nov 3, 2011 1:48 PM
27	bedside lamp (on/off switch outlet is the only accessible one for everything else)	Nov 3, 2011 1:47 PM
28	My alarm clock because that needs to be plugged in 24/7 and my night stand because I want to be able to turn that on at night when I have the outlet switch on off.	Nov 3, 2011 1:42 PM
29	Everything, so I can keep the on/off switch off at all times and I don't have to worry about it. Lamp, laptop charger, sound system.	Nov 3, 2011 1:24 PM
30	My clock/computer/speakers, so that I can use those things but have the rest of the power off.	Nov 3, 2011 1:17 PM
31	use it for a phone charger because of convenience	Nov 3, 2011 1:14 PM
32	To charge my phone and lamp. I mostly use it because it's conveniently located.	Nov 3, 2011 1:13 PM
33	I never do.	Nov 3, 2011 1:12 PM
34	Computer and computer monitor	Nov 3, 2011 1:11 PM
35	christmas lights, things plugged into my power strip	Nov 3, 2011 1:06 PM
36	I don't really do the on/off switch.	Nov 3, 2011 1:00 PM
37	I have a power strip plugged into it, with my laptop, speakers and phone charger plugged into it.	Nov 3, 2011 12:57 PM
38	Computer and clock so it doesn't turn off when the lights turn off.	Nov 3, 2011 12:54 PM
39	for my computer plug (convenience of location next to my desk) and for my phone charger (convenience of location next to my bed)	Nov 3, 2011 12:52 PM
40	Laptop, fishtank	Nov 3, 2011 12:46 PM
41	Would you have 2 min to speak on the phone either today or tomorrow?	Nov 3, 2011 12:42 PM
42	Laptop, speakers, phone charger	Nov 3, 2011 12:41 PM
43	clock	Nov 3, 2011 12:40 PM
44	Clock, so it doesn't reset every time I hit the switch.	Nov 3, 2011 12:40 PM
45	whatever I happen to plug in (what's nearest)	Nov 3, 2011 12:39 PM

Page 2, Q7. If yes, what do you typically use this outlet for and why? ex: convenience of location (because it isn't stuck behind my desk), items used most frequently, whatever I happened to plug in it, etc.		
46	Clock	Nov 3, 2011 12:39 PM
47	I don't know if any of my outlets are connected to the on/off switch. I've never noticed them to be that way.	Nov 3, 2011 12:39 PM
48	I use it for my alarm clock and phone charger	Nov 3, 2011 12:39 PM
49	Computer and phone chargers - things I use the most	Nov 3, 2011 12:13 PM

Page 2, Q8. How often do you leave your on/off switch in the "on" position?		
1	i usually just forget to turn it off, or forget to charge my computer until the nighttime, then have to leave it on	Nov 6, 2011 4:30 PM
2	I rarely use those outlets.	Nov 4, 2011 1:31 AM
3	Sometimes if I'm downloading a big file, I'll have to leave it on to keep my computer running	Nov 3, 2011 11:01 PM
4	and sometimes I forget.	Nov 3, 2011 7:20 PM
5	I turn it off when I leave my room, when I remember.	Nov 3, 2011 2:59 PM
6	the outlet not connected to the on/off switch is inaccessible behind my bed	Nov 3, 2011 1:55 PM
7	never	Nov 3, 2011 1:24 PM
8	I only regularly turn it off if I know that I'm going to be away from my room for more than a day.	Nov 3, 2011 1:15 PM
9	I have my clock plugged into an outlet powered by the switch.	Nov 3, 2011 12:57 PM
10	my alarm clock is plugged into it because that's the most convenient place for it	Nov 3, 2011 12:52 PM
11	never even thought about this, embarrasingly enough	Nov 3, 2011 12:46 PM

Page 2, Q9. What do you typically have plugged in to the outlets that ARE connected to the on/off switch?		
1	I dont know the difference since I dont use the on/off switch	Nov 7, 2011 7:00 PM
2	Lights and a power strip.	Nov 7, 2011 4:31 PM
3	Charger for phone, charger for computer, lamp	Nov 7, 2011 11:29 AM
4	Everything.	Nov 6, 2011 6:57 PM
5	powerstrip-phone charger, laptop charger	Nov 6, 2011 4:30 PM
6	a lamp, my computer charger, speakers	Nov 4, 2011 1:59 PM
7	i have no idea which outlet is connected to on/off. there aren't enough outlets in the new dorms anyways - had to run extension cords everywhere in our rooms/the common room.	Nov 4, 2011 11:29 AM
8	Computer, speakers, lamp, phone charger	Nov 4, 2011 10:22 AM
9	Everything: computer, cell phone charger, hair straightener, speakers, external hard drive	Nov 4, 2011 8:42 AM
10	My computer charger, lamps, other power cords.	Nov 4, 2011 1:31 AM
11	everything?	Nov 4, 2011 12:35 AM
12	Computer, monitor, chargers, speakers	Nov 3, 2011 11:01 PM
13	Computer, lamp, phone charger	Nov 3, 2011 7:58 PM
14	clock	Nov 3, 2011 7:27 PM
15	chargers	Nov 3, 2011 7:20 PM
16	The same as the ones that aren't connected to it...	Nov 3, 2011 5:56 PM
17	Surge protector, which holds my computer, lamps, clock, and pencil sharpener	Nov 3, 2011 5:39 PM
18	Lamps and such	Nov 3, 2011 5:05 PM
19	speakers, amplifier	Nov 3, 2011 4:46 PM
20	Camera charger, computer charger	Nov 3, 2011 4:12 PM
21	computer, speakers, laptop, lamp, alarm clock	Nov 3, 2011 3:38 PM
22	everything (computer stuff, lamps, phone charger)	Nov 3, 2011 2:59 PM
23	Lamp and fridge.	Nov 3, 2011 2:58 PM
24	everything- I never shut off the on/off switch	Nov 3, 2011 2:45 PM
25	I plug in my christmas lights and lamps. Also my hairdryer when I'm using it. So I end up always drying my hair with christmas lights on :)	Nov 3, 2011 2:38 PM

Page 2, Q9. What do you typically have plugged in to the outlets that ARE connected to the on/off switch?		
26	computer charger; phone charger	Nov 3, 2011 2:20 PM
27	Laptop, phone/ipod chargers, other misc.	Nov 3, 2011 2:05 PM
28	Nothing	Nov 3, 2011 2:03 PM
29	computer, speakers	Nov 3, 2011 2:02 PM
30	everything except my bedlamp	Nov 3, 2011 1:55 PM
31	printer	Nov 3, 2011 1:48 PM
32	everything	Nov 3, 2011 1:47 PM
33	Everything - lamps, computer, printer, speakers...	Nov 3, 2011 1:42 PM
34	Nothing	Nov 3, 2011 1:24 PM
35	My bedside lamp, my guitar amplifier, my phone charger.	Nov 3, 2011 1:17 PM
36	Computer, Lamp, iHome	Nov 3, 2011 1:14 PM
37	Lights, lamp, power strip (that I use to charge my computer).	Nov 3, 2011 1:13 PM
38	Power cords.	Nov 3, 2011 1:12 PM
39	Lights phone charger	Nov 3, 2011 1:11 PM
40	computer charger, phone charger	Nov 3, 2011 1:06 PM
41	everything	Nov 3, 2011 1:00 PM
42	Alarm clock radio, lamp.	Nov 3, 2011 12:57 PM
43	A light.	Nov 3, 2011 12:54 PM
44	my alarm clark -it's the most convenient place for it	Nov 3, 2011 12:52 PM
45	laptop but not always, lamp always, cell charger sometimes	Nov 3, 2011 12:46 PM
46	Cellphone	Nov 3, 2011 12:46 PM
47	Just my laptop and phone charger	Nov 3, 2011 12:44 PM
48	everything, its the most convenient	Nov 3, 2011 12:42 PM
49	everything else	Nov 3, 2011 12:40 PM
50	Everything else.	Nov 3, 2011 12:40 PM
51	everything	Nov 3, 2011 12:39 PM
52	Hair dryer, phone charger, light	Nov 3, 2011 12:39 PM

Page 2, Q9. What do you typically have plugged in to the outlets that ARE connected to the on/off switch?		
53	I don't know, never checked	Nov 3, 2011 12:39 PM
54	Computer plugs, lights, other things	Nov 3, 2011 12:39 PM
55	lights, speakers	Nov 3, 2011 12:13 PM

Page 2, Q10. Before living in the new dorms, how frequently did you unplug outlets that were not being used?		
1	only for long breaks	Nov 4, 2011 11:29 AM
2	But I used a power strip so I didnt have to unplug	Nov 3, 2011 1:11 PM

Page 2, Q11. How do you think having an outlet control switch has changed your overall electricity consumption?		
1	I wouldn't call it a great change, especially having a monitor and all, but it's something.	Nov 3, 2011 11:01 PM
2	i do turn it off sometimes, when all my things are charged	Nov 3, 2011 1:55 PM
3	I would say I use slightly less because it's an easy "all-off" option. Even though I would unplug things before, this way I can make sure to turn off everything.	Nov 3, 2011 1:15 PM

Page 3, Q12. How many windows are in your room?		
1	1	Nov 9, 2011 3:16 PM
2	2	Nov 7, 2011 7:01 PM
3	2	Nov 7, 2011 4:32 PM
4	2	Nov 7, 2011 11:29 AM
5	3	Nov 6, 2011 6:57 PM
6	3	Nov 6, 2011 4:30 PM
7	4	Nov 4, 2011 2:00 PM
8	1	Nov 4, 2011 11:30 AM
9	1	Nov 4, 2011 10:23 AM
10	3	Nov 4, 2011 8:43 AM
11	1	Nov 4, 2011 1:33 AM
12	2	Nov 4, 2011 12:36 AM
13	1	Nov 3, 2011 11:02 PM
14	3	Nov 3, 2011 7:58 PM
15	2	Nov 3, 2011 7:32 PM
16	1	Nov 3, 2011 7:27 PM
17	4	Nov 3, 2011 7:20 PM
18	1	Nov 3, 2011 5:56 PM
19	1	Nov 3, 2011 5:40 PM
20	1	Nov 3, 2011 5:06 PM
21	2	Nov 3, 2011 4:46 PM
22	1	Nov 3, 2011 4:13 PM
23	2	Nov 3, 2011 3:38 PM
24	2	Nov 3, 2011 3:05 PM
25	2	Nov 3, 2011 3:00 PM
26	4	Nov 3, 2011 2:58 PM
27	2	Nov 3, 2011 2:45 PM

Page 3, Q12. How many windows are in your room?		
28	4	Nov 3, 2011 2:38 PM
29	1	Nov 3, 2011 2:21 PM
30	1	Nov 3, 2011 2:06 PM
31	Two	Nov 3, 2011 2:04 PM
32	2	Nov 3, 2011 2:03 PM
33	one	Nov 3, 2011 1:56 PM
34	1	Nov 3, 2011 1:49 PM
35	2	Nov 3, 2011 1:47 PM
36	two	Nov 3, 2011 1:43 PM
37	1	Nov 3, 2011 1:25 PM
38	3	Nov 3, 2011 1:17 PM
39	3	Nov 3, 2011 1:16 PM
40	3	Nov 3, 2011 1:15 PM
41	Four	Nov 3, 2011 1:14 PM
42	5	Nov 3, 2011 1:13 PM
43	Four? Two panes that open, two that don't	Nov 3, 2011 1:12 PM
44	1	Nov 3, 2011 1:07 PM
45	3	Nov 3, 2011 1:06 PM
46	1	Nov 3, 2011 1:01 PM
47	1	Nov 3, 2011 1:00 PM
48	4	Nov 3, 2011 12:57 PM
49	1 set	Nov 3, 2011 12:53 PM
50	1	Nov 3, 2011 12:50 PM
51	4	Nov 3, 2011 12:48 PM
52	3	Nov 3, 2011 12:44 PM
53	2	Nov 3, 2011 12:43 PM
54	1	Nov 3, 2011 12:41 PM

Page 3, Q12. How many windows are in your room?		
55	1	Nov 3, 2011 12:41 PM
56	1	Nov 3, 2011 12:41 PM
57	1	Nov 3, 2011 12:40 PM
58	2	Nov 3, 2011 12:40 PM
59	1	Nov 3, 2011 12:39 PM
60	3	Nov 3, 2011 12:39 PM
61	4	Nov 3, 2011 12:13 PM

Page 3, Q13. What direction do your windows face?		
1	a leetle one facing north	Nov 4, 2011 2:00 PM

Page 3, Q14. How often (during the day and when you are in your room) do you use your overhead light?		
1	It's burnt out I think	Nov 7, 2011 7:01 PM
2	My lightbulb burned out :(	Nov 7, 2011 4:32 PM
3	only at night	Nov 6, 2011 4:30 PM
4	i prefer my lamps	Nov 4, 2011 11:30 AM
5	My east facing window gives me enough light in the early morning, but for the rest of the day I need my overhead light on	Nov 3, 2011 1:49 PM

Page 3, Q15. When/if you do not use your overhead light is it because:		
1	I am not in the room/I am asleep	Nov 7, 2011 11:29 AM
2	it's broken	Nov 4, 2011 2:00 PM
3	i hate overhead lighting	Nov 4, 2011 11:30 AM
4	to save electricity when extra light is not really necessary	Nov 3, 2011 1:25 PM
5	i like being in the dark	Nov 3, 2011 12:53 PM

Page 3, Q16. How does your use of artificial lighting this year compare to your use in past years at Pomona?		
1	there is much more sunlight in my room this year	Nov 6, 2011 4:30 PM
2	My room can be dark during the day, sometimes I have to use lights so it isn't like a cave.	Nov 4, 2011 1:33 AM
3	I have absolutely no idea.	Nov 3, 2011 7:20 PM
4	I used to have my own lamp, but this year I don't, so I only use the overhead light	Nov 3, 2011 2:04 PM
5	My windows in Smiley provided daylight for more of the day, so I didn't need my overhead lights as often	Nov 3, 2011 1:49 PM
6	this year my shades can be left open most of the time while retaining privacy	Nov 3, 2011 1:25 PM
7	The 3 windows on my room make the need for artificial light during the day almost nonexistent.	Nov 3, 2011 1:16 PM
8	my room is pretty dark	Nov 3, 2011 12:53 PM

Page 4, Q17. What would you say best determines your use of your air conditioning?		
1	I am unable to control my AC	Nov 7, 2011 7:02 PM
2	automatically comes on when over 76 degrees - seems reasonable. i open windows when it's nice out	Nov 4, 2011 11:33 AM
3	I don't control my AC	Nov 4, 2011 3:03 AM
4	on when it is very hot in my room.	Nov 3, 2011 7:21 PM
5	I only have it on when it is above 100 degrees outside	Nov 3, 2011 3:40 PM
6	i leave it alone to whatever it is by default almost all the time	Nov 3, 2011 2:05 PM
7	it's always "on," but only turns on when the temp goes above 76, which is rare now that the weather has gotten colder.	Nov 3, 2011 1:45 PM
8	Almost always on so far this year. Plan on turning it off when it gets colder.	Nov 3, 2011 12:40 PM

Page 4, Q18. Which of the following options would you say you do before turning on your air conditioning?		
1	ac is on if the window is closed	Nov 9, 2011 3:17 PM
2	don't need to close blinds b/c my window faces north and i never get direct sunlight	Nov 4, 2011 11:33 AM
3	open windows if it's cooler outside than in...	Nov 3, 2011 7:21 PM
4	my ac seems to be always on . . i haven't messed with the settings at all.	Nov 3, 2011 1:27 PM

Page 4, Q19. How often do you use your fan and AC together?		
1	Again, AC is a mystery to me	Nov 7, 2011 7:02 PM
2	my fan is just always on (lowest setting) - i never really turn it off	Nov 4, 2011 11:33 AM
3	I turn on the fan before I turn on the AC. I don't turn it off if it's warm enough to need the AC.	Nov 3, 2011 11:09 PM

Page 4, Q20. What is the use of the AC in your common room?		
1	I don't control AC	Nov 4, 2011 3:03 AM

Page 4, Q20. What is the use of the AC in your common room?		
2	I think it's left to default most of the time	Nov 3, 2011 2:05 PM

Page 4, Q21. If you have had AC in a Pomona dorm room in the past, how would you say your use this year compares to past years?		
1	I've never really noticed	Nov 7, 2011 7:02 PM
2	Well, it wasn't working for a long time, and I'm really not sure how to use it still. The buttons are confusing. And now that it's consistently working, it's cold outside.	Nov 6, 2011 7:02 PM
3	I didn't get to control the AC in Mudd-Blaisdell, but I assume that it wasn't run very conservatively.	Nov 3, 2011 11:09 PM
4	the AC is much worse than that in Blaisdell	Nov 3, 2011 2:05 PM

Page 4, Q22. If your usage has changed, why do you think this is? (Addition of a fan, improved ventilation, increased information on AC use, etc.)		
1	I use it more because I keep my windows closed more (because I'm on the first floor) and it automatically turns on.	Nov 7, 2011 4:33 PM
2	My room is constantly freezing now! And it barely worked when it was hot out.	Nov 7, 2011 11:30 AM
3	Less usage because it's broken.	Nov 6, 2011 7:02 PM
4	I had AC sophomore year in Oldenborg but it was just central AC and one of my suitemates would always turn it on when we didn't need it	Nov 6, 2011 4:32 PM
5	the fan is nice and works well	Nov 4, 2011 2:02 PM
6	just doesn't seem to get as hot in the new dorm - better insulation?	Nov 4, 2011 11:33 AM
7	Addition of fan and my room now just doesn't get as hot as my room in Mudd did	Nov 4, 2011 10:25 AM
8	The addition of the fan has made a large difference, I don't feel like the air conditioning is the only method of cooling I have.	Nov 4, 2011 1:36 AM
9	Again, I actually get to control the AC now. Having a fan is nice, too.	Nov 3, 2011 11:09 PM
10	Controlling the air conditioning is much more difficult here than in other dorms. In addition, if you can simply turn it off without the windows open, I don't know how, but that would be useful.	Nov 3, 2011 8:00 PM
11	n/a	Nov 3, 2011 7:28 PM
12	the fans here are much better than in Mudd-Blaisdell!	Nov 3, 2011 7:21 PM
13	Fan	Nov 3, 2011 4:14 PM
14	I find the ceiling fan sufficient for 90% of the time	Nov 3, 2011 3:40 PM
15	fan + windows open	Nov 3, 2011 3:06 PM
16	The fan really helps.	Nov 3, 2011 2:39 PM
17	Addition of the fan, for sure.	Nov 3, 2011 2:05 PM
18	I use AC less than in the past because the coolest setting is limited to 76 degrees. When I lived in oldenborg, I kept the air conditioner on all the time so it averaged ~68 in my room.	Nov 3, 2011 1:58 PM
19	I have no idea how to turn the AC off, so it seems to always be on.	Nov 3, 2011 1:16 PM
20	In Blaisdell I couldn't control it so it was often on when it didn't need to be. It's great to have it be personally controlled.	Nov 3, 2011 1:15 PM
21	Fan	Nov 3, 2011 1:01 PM
22	Addition of a fan, though ventilation was better in my room last year (able to set up a cross-breeze).	Nov 3, 2011 1:01 PM

Page 4, Q22. If your usage has changed, why do you think this is? (Addition of a fan, improved ventilation, increased information on AC use, etc.)		
23	Ceiling fan, better ventilation	Nov 3, 2011 12:42 PM
24	Easier to adjust so that the AC is only running a little bit.	Nov 3, 2011 12:42 PM
25	Addition of a fan!	Nov 3, 2011 12:40 PM
26	fan, only goes to 76 (often it is already cooler than that), better windows	Nov 3, 2011 12:15 PM

Page 5, Q23. Have you read the placard on green living in your room?		
1	Just read it now	Nov 7, 2011 7:03 PM
2	Not sure I have one?	Nov 3, 2011 1:02 PM

Page 5, Q24. Do you remember what the placard in your room says? (No peeking)		
1	Yes, because I just read it	Nov 7, 2011 7:03 PM

Page 5, Q25. If you read it AND remember what it says, have you taken the information into consideration when making decisions on your energy use?		
1	It's pretty much common sense	Nov 7, 2011 7:03 PM
2	I knew most of it already. Having the power switch is really the only new thing.	Nov 3, 2011 11:12 PM

Page 5, Q30. Do you remember what the signs in the laundry room say?		
1	Something like use a dryer rack	Nov 7, 2011 7:03 PM

Page 5, Q31. If you read them AND remember what they say, have you taken the information into consideration when making decisions on your energy use?		
1	I do wash my clothes with colder water than before, but I end up using the dryer a lot because I procrastinate on laundry and have to wash more than our drying rack holds.	Nov 3, 2011 11:12 PM
2	I did these energy saving techniques prior to reading these cards.	Nov 3, 2011 1:46 PM
3	I haven't read them because I don't think I've noticed them. I do try to never use hot water in the wash and to set the dryer on the shorter cycle.	Nov 3, 2011 1:19 PM

Page 6, Q32. When doing laundry, which of the following did you do regularly prior to this year?		
1	wearing clothes several times before wash	Nov 3, 2011 2:13 PM

Page 6, Q33. Which of the following do you do regularly this year?		
1	can you even clean these lint screens?	Nov 4, 2011 2:04 PM
2	hurt back. carrying wet laundry up stairs is no longer possible. also, people leave their clothing hung up for DAYS.	Nov 3, 2011 7:23 PM
3	I do not know how to run the machines with cold water in the new dorms	Nov 3, 2011 3:42 PM
4	wearing clothes several times before wash	Nov 3, 2011 2:13 PM

Page 6, Q34. If your habits have changes, what would you say caused these changes?		
1	Drying lines are available to everyone in the Sontag laundry room, so I hang my clothes this year, unlike last year	Nov 4, 2011 3:06 AM
2	i don't know how to clean the lint screen on the Pomona hall dryers.	Nov 3, 2011 1:28 PM

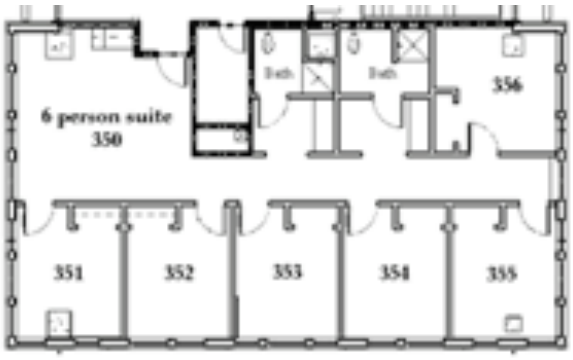
Page 7, Q36. Do you make use of the dual-flush feature?		
1	Honestly, the up flush is more than sufficient for anything	Nov 6, 2011 4:34 PM
2	it doesn't work!	Nov 3, 2011 7:29 PM
3	the up flush leaves toilet paper behind :(	Nov 3, 2011 3:03 PM
4	Ours is supposed to be dual flush, but only the heavier flush is operational... I would use it if I could	Nov 3, 2011 1:52 PM
5	for the number two flush, water comes out, so we only use option number one. I don't think there's a difference between the two.	Nov 3, 2011 1:47 PM
6	It doesn't seem to make an difference at all	Nov 3, 2011 1:29 PM
7	Not sure if the sticker was put on correctly...it is upside down compared to most. Unsure if I am using it correctly.	Nov 3, 2011 1:03 PM
8	Ours doesn't work	Nov 3, 2011 12:46 PM

Page 8, Q38. What do you use these spaces for?		
1	Video games	Nov 3, 2011 11:14 PM
2	Making popcorn every night when I'm high!	Nov 3, 2011 2:07 PM

Page 8, Q39. How often do you use the main common room and/or kitchen on the first floor?		
1	it's the same on each floor for us in sontag	Nov 3, 2011 2:00 PM

Page 8, Q40. What do you commonly use this space for?		
1	stored some food there once, used it for OA	Nov 3, 2011 12:42 PM

Appendix 2. Example layouts of suites in Pomona and Sontag Halls



2.1. Six-person suite

2.2. Four-person suite

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