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Sustainability Internship with Marvin Pate
Environmental Studies Internship Fund (Mellon)
Summer 2010

Over the summer of 2010 my internship was funded by the Environmental Studies Internship Fund. I worked along side another Sewanee student that I know very well and, in fact have known for a good deal of time. Having a partner was very beneficial to the internship as a whole because on many occasions my partner and I found that we lacked the skills required to complete a given task but we were able to get through these difficulties by working together. On many occasions my partner was able to do tasks that I was not very capable of and vice-versa. We worked in the PPS head quarters located on Alabama Avenue just between the geology/forestry building, Snowden and the archives building and were overseen and instructed by the University Head of Sustainability, Marvin Pate. Our usual work hours were 8 A.M. to 4 P.M. but some days stretched slightly over and others were cut a bit short.

The overall idea of the internship that I participated in was to learn about sustainability and energy conservation, how we are wasting energy at the University and the many techniques that could be employed to curve this trend of wasting energy and, just as importantly, money. We learned very quickly that just because you come up with a solution for a practice that wastes energy does not mean that it will automatically be put into action. You have to convince the right people that your idea is best for the school; namely you have to convince the administration and the alumni. You have to sell the idea to the right people by showing the initial cost of your solution and how much money the idea will save in the long run. It is a very fortunate thing for those who are working in the field of sustainability and energy conservation that saving energy also saves vast amounts of money. This is not initially true however, as the costs of energy conservation plans are

often quite steep. Pay back periods of energy conservation plans are often very long but once that period is complete the party that implemented the plan can begin to pocket funds that were once tied up in wasteful energy practices.

One of the first tasks that was set before me and my internship partner was to make a catalog of all the light bulbs that the University keeps stocked at its Physical Plant Services warehouse. The goal of this task was to inventory all of the bulbs that the university uses in its facilities and highlight any bulbs that are particularly energy inefficient. The first week and a half or so of the internship was spent photographing and recording the specs of about 200 different light bulbs. Our internship advisor Marvin Pate was especially excited about this accomplishment, as Sewanee is the first university to catalog all the light bulbs that are used in its campus facilities. Once all the bulbs were cataloged we were able to move on to identifying which bulbs we thought the University should no longer stock. We worked closely with Physical Plant Services' electricians to figure out which bulbs were energy hogs and which bulbs had abnormally (and unacceptably) short life spans. In the end we identified two bulbs that were big problems in that they wasted too much energy and had too short of lifetimes. One of these bulbs was simply replaced with a fluorescent bulb that used considerably less energy and lasted much longer. The other such bulb that we identified is still being pondered because its replacement is an LED bulb that is very costly. All in all the LED replacement would have been a great move but the initial cost of the bulbs was not an easy obstacle to overcome.

One of our other major tasks was to perform energy audits for large buildings on campus including DuPont Library, McClurg and Spencer/Woods. Although we worked

on all of these buildings, our main focus was on the DuPont Library. In these energy audits we were working on what we called E.C.O.'s (energy conservation opportunities) with a specific focus on lighting and HVAC (heating, ventilating and air conditioning). A light meter was used to measure foot-candles in the book stacks and in public study areas. In many areas the lighting was much too high and thus we considered cutting down on the number of 4 foot fluorescent bulbs used in a given area. In other areas where light was too low we looked at opportunities to increase the light without using extra electricity. For example many of the carrels in the library were positioned in a way that blocked natural light from entering the windows. In these instances we worked with library workers to rearrange carrel orientations so that more sunlight could enter the room and more natural light could be utilized.

Another possibility that we considered in these audits was inspired by a lighting study that took place in California in which fluorescent bulbs with higher Kelvin ratings were implemented in office settings. As it turns out higher measurable foot-candles is not the only aspect of a light bulb that constitutes a bulb producing more or higher quality light. The Human eye can perceive more types of light than a conventional light meter and thus bulbs with higher Kelvin ratings can produce the same amount of foot-candle readings as those with lower ratings but the human eye still perceives more and higher quality light. In DuPont we tested this by placing 32-watt fluorescent bulbs with 4100 Kelvin ratings (our current standard) in one row of shelves and 5000 Kelvin bulbs of the same wattage in the row of shelves right next to it. The foot-candle readings were the same but the 5000-Kelvin bulbs appeared to be much brighter to the human eye. By

implementing the 5000-Kelvin bulbs and cutting down on the number of bulbs used in each row of shelves we were able to save a considerable amount of energy.

Another problem that we worked on was the amount of light fixtures that were operational in atrium areas such as the one in the new Spencer building and DuPont Library. We perceived no difference in lighting levels in these atriums (during sunny days) when the lights were on or off. The sunlight that came through the large windows drowned out all of the artificial light thus making our efforts to light these areas during the day useless. For this problem we considered the possibility of using ambient light sensors that could control the light fixtures according to the amount of sunlight that was spilling into the room through the windows. The air conditioning in both of these buildings was also much too powerful (even on the hottest of days). With the air turned down so low too much energy was being used, especially considering the fact that the buildings were only occupied by a very small number of people during the summer. The low air conditioning was also causing a lot of condensation that created more problems for maintenance workers. Part of saving money for the university is practicing techniques that prevent maintenance workers from constantly battling the same problem such as condensation from air vents or constant light bulb replacement.

Another big task that we worked on was to calculate the carbon footprint of the University (or at least sort through the notes and resources that the previous workers used in their attempts to calculate the carbon emissions of the school). For this task we used the “Campus Carbon Calculator” spread sheet that is provided free to all who want to use it by “Clean Air Cool Planet.” This spread sheet allows universities to calculate their carbon foot print by simply plugging in numbers for certain categories such as how much

gasoline the University uses or how much fertilizer or coolant they use. Plugging in the numbers is the easy part; the hard part is tracking down the numbers to plug in. We had to contact the treasurer for utility bill information, the registrar for student, faculty and staff population, the PPS warehouse for gasoline records and countless other University administrators to obtain records concerning our carbon footprint. In the end we did not have time to complete the spreadsheet because of time restraints and lack of numbers (which will not be available until the middle of this school year) but we put together a handbook with all the data that we acquired and our methods of obtaining it so that the person or persons that work on the spreadsheet after us (as it is an ongoing process that will continue from year to year) will be able to easily check our numbers and understand where they came from.

On a normal day, my internship partner and I would arrive at the office at 8 A.M. and begin entering numbers that we had obtained the day before into the "clean air cool planet" spreadsheet or do calculations on energy conservation opportunities to determine how much the school's initial cost of implementing the E.C.O.'s and how long the pay back would be. We would perform this computer work for an hour or so and then we would normally have a meeting with a lighting company. For example, we would meet with companies such as "Erby" and "Luminous" or representatives from TVA to discuss the possibility of them working with us to conserve energy or the aspects and quality of their product. These meetings were very interesting and allowed us to get a taste of what a normal business meeting is like. Some of our time was spent in the PPS warehouse inventorying light bulbs and ballasts. Lunch was a forty-five minute break and then we would return to the office to either write summaries of the meetings we had just been to

or wrap up entering numbers into the carbon calculator spread sheet or E.C.O. spread sheet. At least once a week out internship advisor would check on our progress and make sure we had tasks to complete. The meetings with our internship advisor would last anywhere from twenty minutes when we were very busy, to two hours when we were struggling to complete a task or organize a complicated plan of attack for another task. Many days were spent outside of the office so that we could walk around the library and the other buildings that we were auditing in order to gain knowledge concerning the lighting and HVAC specs of the building. Office time, however took up a great deal of our work.

As of yet I still do not know what jobs I am interested in for the future but this internship helped me get a bit closer. I know now that I want to work with sustainability and energy conservation as a career. I would like to use my anthropology major to work with sustainability either in non-profit or rural farm practices that concern sustainability. Before this internship I was not very confident that I would be able to adjust from the world of academia to that of business, however now I feel much more confident that I will be able to contribute to sustainable practices in America and, if I get lucky, possibly in other countries.