



Warren Wilson College
Asheville, NC
Energy – Real-Time Monitoring

FELLOW

Gideon Burdick, 2009-2010
Warren Wilson College

SCHOOL

Warren Wilson College is an accredited 4 year private liberal arts college in Asheville, North Carolina.

ABSTRACT

In December of 2008 we began development of a low cost real time utility monitoring program that would provide dormitory occupants with web based display showing occupants the buildings electricity, natural gas and water consumption. Currently the back end development of the project, a custom circuit board has been completed and successfully tested in a small residence hall. We are looking for additional funding in order to fully fund a web development proposal that would provide us with full functionality. It is our hope to eventually be able to provide a lost cost alternative to other small liberal arts colleges and universities. It is difficult to gauge the greenhouse gas impact and estimated savings. A 5 to 10 percent savings for our 2008-2009 fiscal year would have resulted in a savings of \$25,924 and \$51,848, the equivalent to full scholarships for one to two students, at a school with roughly 800 on campus residents.

GOALS AND OUTCOMES

Goals

The goal was to provide 10 residence halls (roughly half) with a web based feedback of there utility consumption by either installing my custom developed technology or interfacing with building control systems already in place. It was our hope that by closing the feedback loop we would be better able to affect behavior and encourage reductions in consumption. This initial goal was an aggressive target and was later modified as a result of a hardware issue that took longer than should have been permissible to remedy.

The next two to three years of the project remain unknown. As this was a student initiated project at a work college other students have been trained with the information necessary to continue development of the web based feedback and construction of our circuit boards. In addition to this I am currently awaiting word from Warren Wilson College as to the possibility of being hired as an intern to be the assistant crew leader for the work crew responsible partly for development and installation. Should this occur I would be able to provide a much higher level of involvement than e-mails answering any questions that arise and hopefully continue to work towards functionality in all dorms.

Finally, I have discussed with the electrical engineer of the possibility, in addition to helping Warren Wilson, of taking our work into the private market and continuing development as a small business idea. Currently only preliminary conversations have been held and it would be some time before this became a reality.

Accomplishments and Outcomes

We did not achieve our goals of implementing this system in ten dorms. We hit a major hang up in the development of a new product and had to contract with an outside company to assist in the completion of the hardware development. At the close of the fellowship period we had a working product, but as the fellow graduated it is unknown if students will take the remaining funds and work with web development teams to develop web based feedback.

During our snag in hardware development we were attempting to save as much of our funds as possible by looking for volunteer or low cost sources, in the end it was more efficient to pay a professional company to complete the needed fixes we needed.

Our work was included in the colleges Climate Action Plan ¹ that outlines ambitious goals to reducing the colleges carbon footprint through reductions in electricity, natural gas, water and gasoline usage. In addition the project internalized the need for some sort of monitoring or control technology in the colleges residence halls.

Challenges and Responses

We ran in to a lack of technical expertise at Warren Wilson when developing our custom hardware solution. Because we spent a great period of time attempting to find a free solution we then placed an incredible time crunch on the web development aspect of the project and were unable to complete it during the time period. In retrospect we should have contracted this problem as soon as it developed in order to buy us time to use student labor to develop a custom website. It is my hope that students in the upcoming school year will take this project and make it there own.

Campus Climate Action: Your School's Carbon Footprint

As stated in the abstract we've estimated a savings of 221,315 kWh, or \$16,721 in electricity and 11,391 therms or \$9,203 in natural gas consumption. While these numbers are fairly abstract the colleges dormitories are the major sources of consumption on campus and it is our hope that these numbers are understated, rather than overly optimistic.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

The project could not have carried forward without the support of the following individuals:

- John Moon, Professor, School of Engineering Technology. Cambrian College
- Paul Braese, Director of Facilities Management Technical Services
- Margo Flood, Director of the Environmental Leadership Center
- Sloan Poe, Network Systems Administrator
- John Griffith, Electric Crew Supervisor
- Dylan Suter, Assistant Electric Crew Supervisor
- Abi Locatis, Energy Services Crew Member

¹ Available at http://www.warren-wilson.edu/~ELC/New_ELC_Website_/ClimateActionPlan.php
National Wildlife Federation • Campus Ecology • 2010

In addition the following college committees and work crews were responsible for encouragement and support;

- WWC Greenhouse Gas Emissions Task Force
- Energy Services Work Crew
- Electric Crew

Funding and Resources

The project was part of the colleges work program which requires students to work 15 hours a week on various work crews throughout the college. Energy Services is responsible for preliminary audits of the colleges building stock, the development of a college wide energy plan and recommending solutions that reduce the colleges utility consumption. This work crew was a natural place for me to work on this project.

In addition to the NWF Fellowship program we received institutional support (\$1,000) from the presidents discretionary funds, a supplemental grant from the United Nations Foundation The People Speak competition (\$500) and a significant grant from Brita Filter For Good (\$10,000). We spent approximately half of this budget in the successful development of the hardware and the purchase of the needed equipment to monitor electricity in all of the colleges dormitories.

Education and Community Outreach

An article ran in the Asheville local alternative newspaper, the Mountain Express in addition to a feature article in the Asheville Citizen Times. In addition articles ran in Warren Wilson Colleges Environmental Leadership Center's Catalyst and student publication The Echo.

The Energy Services work crew participated in work crew fairs in which the project was highlighted as a part of the work crews functions. Finally, as originally outlined in the grant proposal by using student labor to install supporting aspects of the fellowship project we were able to raise interest and investment in the project among the student population.

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