



Hopkinsville Community College Hopkinsville, Kentucky Energy

SCHOOL

Hopkinsville Campus, Public, 2-year, 3,834, Hopkinsville, Kentucky

ABSTRACT

In late September of 2012, Hopkinsville Community College began production with its 25 KW solar array. Consisting of 28 panels and prominently displayed collection data in the campus' primary classroom space, this installation affords the STEM faculty a unique opportunity for real-world applications. As the array has been producing less than a month, the institution is still working on ways to integrate its data into curriculum, and biology, electronics, and physics faculty are taking the lead. The precise data from the solar array presents an excellent opportunity for science instructors at HCC. Since electricity produced by solar panels offsets the combustion of fossil fuels for power production, students can observe how this technology reduces carbon dioxide emissions and instructors can relate this reduction to the greenhouse effect and climate change. Because solar energy drives photosynthesis in plants, seasonal data can be used to demonstrate the change in the intensity of the solar radiation available to plants during different times of the year. Physics and astronomy students could use the static angle of alignment of the panels to make predictions of the power output throughout the year and then compare those predictions to the actual yield. Further discussion topics could include photovoltaics, efficiency/entropy and the effects of cloud cover and temperature on power production. In the Manufacturing Industrial Technology: Electrical Technology program, solar / renewable energy is coming to the forefront very quickly. Students in the program are not as concerned with the installation of solar panels as much as the efficiency and repair of the systems. We train our students on the troubleshooting and repair of electrical circuits, which is a needed skill since most projects are installed by contractors, but are maintained by Maintenance Techs. Our job is to train those Maintenance Techs. As far as curriculum is concerned, the project has no known costs.

GOALS AND OUTCOMES

Goals

The institution's primary goal in installing the panels is to conserve energy and if possible to reduce operational costs. Having the chance to apply information from the collectors in curriculum is an additional boon, since it serves as a directed exposure to the use of renewable energy in our community. (Having the monitors that show that information in hallways allows passive exposure to the data, but integrating the information into coursework guarantees our students'



exposure to renewable energy and their ability to critically analyze situations using it.) In the next 2-3 years, we hope to contract with a group that allows us to get more usable data from the panels; currently the data are manually collected and shared with faculty and staff by an employee. When we are able to, we plan on publicizing real-time kWh production information on our website.

Accomplishments and Outcomes

As currently envisioned, data on the energy production, physics, and maintenance of our solar panels will reach approximately 140 students/semester (~40 in the MIT courses, ~30 in the physics courses, and ~70 in the biology courses). To date, we have produced 2.54 MWh of electricity, all of which has been used in powering buildings on campus.

We haven't adopted new policies, per se, though we have changed a bit of campus culture in the widespread dissemination of data concerning energy production. All faculty have access to information about kWh production, peak times, carbon offsets, and lifetime production of the array. Initially, the data were collected and distributed manually, but with improvements in our management software, we should be able to automate the distribution.

Challenges and Responses

The primary challenge to helping faculty appreciate the applicability of data from the PV array is time and human resources. If we had it to do over again, we would have provided professional development opportunities for interested faculty prior to installation (or during it, before going live) to better integrate concepts of sustainability and renewable energy into coursework.

Our community has very little exposure to renewable energy or recycling, and as such, we serve as a touchstone for our students' appreciation of sustainable behaviors and development. Therefore, it was important to us to be able to first demonstrate energy savings very clearly to our student body, and second to integrate core concepts of sustainability. We were able to accomplish the first by installing the energy monitor in a high-traffic area of campus and the second by working with interested faculty to develop curriculum. Due to our recent involvement in a grant from the State Energy Sector Partnership to educate students in chemical engineering technology for employment at the nearby PV producer Hemlock Industries, there is *some* appreciation for the employment opportunities in PV development, but there is little extension of that appreciation into the utility of renewable energy sources. Curricular integration and prominent display and discussion of the utility of renewable energy will help improve our students' and community's understanding.

Campus Climate Action: Your School's Carbon Footprint

Yes. During the lifetime of the PV installation (28 days, to date) we have produced 2.54 MWh; the equivalent of 1.75 tons of CO₂.

Commentary and Reflection

Curricular integration of operational advances on a campus – using a college campus as a living laboratory of sorts – requires a great deal of inter-department cooperation, respect, and open avenues of communication among many different groups. The interdisciplinary nature of Hopkinsville Community College's Green Team helps foster these strong relationships to encourage educating for sustainable development throughout our curriculum. We cannot overstate the importance of professional development for faculty to help them bridge the conceptual hurdle between their own disciplines and

educating for sustainability. Even in disciplines where the connection is clearest (STEM in this case) it is important to provide diverse resources to faculty as they prepare to work with this kind of information.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

Integration of the PV array data into curriculum started with faculty and has been pushed by faculty since the panels went live. The biology member (Jason Arnold) who first asked about getting actual data from the array has his office across the hall from the monitor displaying that information; this might indicate that if a broader assortment of faculty could see the information every day they walk to their offices, (or have it delivered to them electronically) they'd be more likely to apply it practically. Additional faculty, Scott Bain (Physics) and Stuart Ziemann (Electrical Technologies) have also done work to develop curriculum. Our IT staff, primarily Tony Nelson, has done much to ensure that current data were displayed on the monitor, in spite of having to manually update information. Sustainability chair Kristy Howell worked with faculty and IT staff to find information to assist with curricular integration and provided daily updates of data for interested faculty. Finally, our facilities staff and administration secured and supervised the installation of the panels.

Funding and Resources

Because this project was funded using institutional monies, our business affairs office and chief business affairs officer were unwilling to discuss or release any cost or funding information for the installation of the solar panels. The curricular integration and dissemination of information had little-to-no actual cost and were duties assumed by employees in the course of their regular responsibilities. We were not supported through a NWF Campus Ecology Fellowship.

Education and Community Outreach

Education and community outreach are ongoing. As stated above, Hopkinsville residents have very little exposure to renewable energy options and as such the solar panels provide a unique educational opportunity for our students and employees, as well as the broader community. Students on our extended campus, at Fort Campbell, have indicated interest in the PV installation, even though their contact with the Hopkinsville Campus is limited, several faculty members have mentioned the installation and are excited to begin work on their own curricular integration as soon as we improve at sharing production information across campuses.

National Wildlife Federation's Campus Ecology Program

The following NWF Campus Ecology resources were used: online case study database, *Higher Education in a Warming World: The Business Case for Climate Leadership on Campus*

CONTACT INFORMATION

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

Hopkinsville Community College has operated under an institutional sustainability plan since 2008 and has a number of ongoing sustainability efforts. We have one building that utilizes geothermal energy and several other initiatives, from LEED-guided renovations to sustainability-focused sociology coursework. We are new members of AASHE and the Commonwealth's first Community College participant in their STARS program. We have a multi-disciplinary sustainability committee, and we are in the process of building a campus sustainability website. We have an active social media presence on Twitter.

Image Credit: Hopkinsville Community College