

Appalachian State University: Supporting Solar Energy through a Student-Financed Renewable Energy Initiative

Solar on Campus

On-site solar projects help colleges and universities reduce energy costs and lower carbon emissions. These projects have much more potential when the institution's students are involved in the full financing and development process. From feasibility assessment and system design to financing and project management skills, the possible educational experiences are extensive. As these projects are typically built in visible locations, the learning potential applies not only for students but for the campus community as a whole.

About Green Fees and Renewable Energy Funds

Despite the many benefits of renewable energy systems, securing funding for smaller on-site and student-managed projects can be a challenge. At many campuses across the U.S., students have successfully created "green fees" to fund a wide range of sustainability-focused projects from community gardens to bike sharing programs. Typically ranging in the cost of \$5-50, green fees are added to the fees students pay with tuition. In some cases, the university may also provide matching funds or alumni donors may contribute more to the amount generated by students. On some campuses, student leaders have designed the funds to focus on supporting renewable energy projects. Motivated by climate change goals, students at these campuses use their financial investments to pursue measurable carbon reduction projects. Carbon reduction impact per dollar invested in renewable energy projects (connected to the grid or building meters) can be simply and accurately measured. Through these innovative and self-financed renewable energy-focused funds, students have found success in overcoming financial barriers to support solar energy and education on campus.

"ASUREI's mission is to reduce Appalachian's carbon footprint by replacing the university's existing energy sources with cleaner forms of renewable energy"

- Caitlin Stepp, ASU Graduate '12,
Former vice chair of the Appalachian
State University Renewable Energy
Initiative (ASUREI)

Appalachian State University's Climate Commitment

Located in Boone, North Carolina, Appalachian State University (ASU) had been a signatory of the Carbon Commitment since April 2008 and became a signatory of the Climate Commitment in January 2016 by incorporating resilience actions into their carbon neutrality goals. ASU's Climate Action Plan has set 2050 as its carbon neutrality target date and also stresses the importance of sustainability education for all students. ASU has invested in multiple renewable energy technologies, obtaining energy production from wind, solar thermal, and solar photovoltaic (PV) technologies. The solar PV systems on the campus contribute 7% of ASU's renewable energy generation.

"Appalachian's longstanding sustainability leadership and practices are the foundation of who we are as an institution. The work of our faculty, staff, students and alumni ensure a bright and sustainable future for our community, state and beyond. Our commitment, combined with a dedication to deep engagement with communities, leads to positive and powerful learning and service."

- Sheri N Everts, President, ASU

About the Appalachian State University Renewable Energy Initiative

The Appalachian State University Renewable Energy Initiative (ASUREI) is an early example of innovative renewable energy-focused green fees. As of the 2015-2016 academic year, ASUREI had funded 15 projects with six additional projects currently in the production pipeline. Eight of the installed projects are solar PV while the rest are solar thermal, biodiesel production, and wind energy projects.

The ASUREI was created in 2004 when Ernie Hodgson, a student in the ASU Sustainable Energy Society, proposed a referendum to the student body for a green fee of \$5 per semester. The proposal passed with over 83% approval from voting students. After approval from the ASU Chancellor and Board of Trustees, funds began accruing in 2005. In 2007, students chose to continue supporting the Renewable Energy Initiative past its initial three-year period with 92% approval. With over 18,000 students, the estimated amount accrued each year is \$180,000. The total amount spent on projects to date is \$670,000.

Members of the campus community have the opportunity to submit green fee project proposals through an online form. A committee comprised of students, faculty, and staff review the projects and vote on their approval. When selecting energy projects, the ASUREI committee considers the project's suitability, estimated system production or offset, and cost-savings analysis. Energy efficiency projects are limited to 20% of the distributed funds and must show aggressive returns on investment. For solar projects, students are required to produce a modeled forecast of system production over its lifespan using industry standard tools including the Solar Pathfinder and Solmetric SunEye.



Projects & Student Engagement

*Photo courtesy of Sundance Power Systems

Biofuels Facility PV System

Completed: 2007

Capacity (KWh): 2

Annual Production (KWh): 2,457

Cost: \$17,500

Funding Method: ASUREI/EPA grant

Student Engagement: Designed to supply electricity to offset energy needed for the production of biodiesel fuel, the [Biofuels Facility](#) started as a student-led project and was funded in part by the EPA P3 Award

E3 House System

Completed: August 2010

Capacity (KWh): 3

Annual Production (KWh): 3,745

Cost: \$30,000

Funding Method: ASUREI

Student Engagement: The [E3 House](#) has a roof mounted PV system with a battery back up, and is designed for disaster relief situations when there may be no access to electricity. Students of the Building Science and Appropriate Technology programs built this project as a culturally and environmentally adaptable alternative to FEMA Trailers after witnessing the response to Hurricane Katrina.

State Farm Solar Research Facility System

Completed: 2011

Capacity (KWh): 8

Annual Production (KWh): 8,967

Cost: \$33,453.44

Funding Method: 75% ASUREI, 25% Appropriate Technology Department

Student Engagement: This unit allows for research opportunities, focus on studying PV and solar thermal technologies.

Blackburn Vonnoy Farm House PV System (Garage)

Completed: 2012

Capacity (KWh): 7

Annual Production (KWh): 11,020

Funding Method: ASUREI

Student Engagement: Installed by graduate students, the Blackburn Vonnoy Farm House PV project provides energy for a faculty and student house



Lessons Learned from Renewable Energy Initiative at Appalachian State University

**Photo courtesy of Appalachian State University*

Graduate students studying in the Appropriate Technology concentration in the Department of Sustainable Technology had long been encouraged to explore implementing on-campus solar projects at ASU. This allowed students to apply specific technological knowledge acquired through program courses such as “Building Mechanical Systems” and “Photovoltaic System Design & Construction”. Prior to funding availability through ASUREI, proposed PV projects were meant to simply promote renewable energy with less emphasis on projecting financial returns. Financial modeling and budgets have since been given greater emphasis in educational programs, and students give greater priority to return on investment.

For more information on going solar at your campus visit:

solarendowment.org

For more information on Second Nature and the Climate Leadership Network visit:

secondnature.org

Or contact: commitments@secondnature.org

A key challenge of the ASUREI program is maintaining student involvement throughout the duration of the project, from proposal to completion. A variety of factors can create barriers to student involvement including that students may not get involved right away. The length of time required for administrative project approval can take some time, impacting the proposed financing and contracts and making it difficult to formally include class involvement during a one-semester period. To address these challenges, ASU has developed a workshop that walks participants through the solar PV design and construction process before they apply to ASUREI. The objective for participants is to learn how to assess the solar resources available at a particular site and to estimate the energy production and economics of a PV system. Participants learn how to design and construct safe and reliable code-compliant photovoltaic systems on Appalachian State’s campus. ASUREI has proved to be an excellent way to involve students and reap the educational benefits of solar projects, while also ensuring that proposals make it to the implementation phase. Part of the success of the program is due to faculty and staff involvement. Through involvement with project selection, faculty and staff become responsible for the maintenance and education surrounding the project in the long-term.