

**Mountain Solar: Assessing the Potential for Solar Development in Cocke
County, Tennessee**



The University of Tennessee

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Final Report Narrative

Name of Project: Mountain Solar: Assessing the Potential for Solar Development in Cocke County, Tennessee

Grant Period: February 1, 2012 – June 30, 2013

Grantee Name: The University of Tennessee, Knoxville Project Director: Dr. Tim Ezzell

Description of Project:

Since 2009, the development and expansion of solar technologies has been a priority of both the state of Tennessee and federal governments. Federal officials have established ambitious goals to increase solar adoption rates and dramatically lower the costs associated with solar installations. To date, extensive research has been conducted to identify and address solar barriers in large urban areas. Little research has been conducted, however on the use of solar technologies in small rural communities. This is particularly true in Appalachia, a region long associated with extractive energy resources.

This project explored the potential for solar energy in an Appalachian case study community. Cocke County, Tennessee was selected due to its proximity to the University of Tennessee and its willingness to participate in the research program. Students in the class sought to answer the following research questions:

- What is the local perception of Solar Energy?
- Are their non-technical barriers to solar adoption in the community, such as code restrictions, interconnection issues, or physical constraints?
- Are there existing best practices for rural solar that are applicable for Cocke County or other Appalachian communities?
- Could solar technologies help attract new jobs or industries to the region?

Students address these questions using a wide range of research approaches by developing and distributing a local survey, conducting stakeholder interviews, and by conducting technical and policy research.

Activities:

In order to gauge local perceptions, students conducted a survey of local decision makers and key stakeholders. Students developed the survey questionnaire, compiled a distribution list, conducted a UT IRB review process, mailed and tracked survey packets, and compiled and analyzed the survey results. A copy of the survey questionnaire and the survey results are included in the appendix.

Students conducted interviews with local officials and stakeholders, including the following:

- Local codes officials
- Local elected officials
- Representatives from Newport Utilities
- Local solar installers
- Solar experts from The University of Tennessee

Jean Peretz, Managing Director of the Tennessee Solar Institute (TSI) conducted a guest lecture for the students and discussed her experiences working with rural communities and with the development of the UT Solar Farm in West Tennessee. Ms. Peretz also reviewed the class's survey materials and findings.

The students created a Facebook page for the project to help promote project events and activities:

<https://www.facebook.com/CockeCountySolar?fref=ts>

The students conducted a local solar forum to share and discuss project findings. The event, conducted at Newport Utilities on November 20th, included representatives from local utilities, local banks, a solar installer, and interested local residents.

The students conducted policy research and identified development opportunities and best practices. Topics included tourism opportunities, installations on low-income housing, modular data centers, and increasing telecom access through the use of solar communications towers. Students also examined workforce development issues and identified model programs that might be applicable for rural communities.

As an "outside the box" idea, one student also explored the potential for a solar powered airport site. Based on his analysis, the class found that the airport concept, while innovative, was not viable.

Project Outcomes:

Project findings included the following:

- The survey demonstrated that, despite the long association with extractive resources, local residents appear to be highly receptive to solar technologies and enthusiastic about solar energy.
- Survey respondents; however, appear to have unrealistic expectations regarding the cost and performance of solar systems.
- Non-technical barriers appeared to be minimal, but might increase as adoption becomes more commonplace.
- Local topography and vegetation restrict solar access in some areas and will likely deter adoption by some residents.
- Solar technologies have the potential for economic development and job creation. Development opportunities include integration with local tourism sites and the creation of modular data farms.
- Widespread solar adoption may also help change external perceptions of the region and could help increase local pride.
- Increased solar adoption will require additional consumer education and the development of a trained solar workforce.

In addition to the project findings, the class research resulted in the following additional outcomes:

- Asa Roy, a student in the class, earned the opportunity to conduct additional research on the topic with UT's Bredesen Center for Interdisciplinary Research and Graduate Education. During Spring semester, Asa worked closely with TN-SCORE (Tennessee Solar Conversion and Storage using Outreach, Research and Education), an initiative funded by a \$24 million National Science Foundation EPSCoR RII Track I Research Infrastructure Award, to explore additional opportunities to promote solar development in rural communities.
- Based on their participation in the ATP solar project, Cocke County officials agreed to participate in a proposed DOE Sunshot Solar Rooftop Challenge Phase II proposal. Officials from Morristown, who attended the Cocke County forum, also agreed to participate in the proposed project, which includes the University of Tennessee, The University of Alabama in Huntsville, Mississippi State University, and Western Kentucky University. The \$1.9 Million project, if funded, would help reduce non-technical barriers to solar development across the TVA service region and would also include ARC communities in Virginia, North Carolina, Georgia, Alabama, and Mississippi. The proposed project's budget includes a graduate assistantship for James West, a student in the ATP class.
- Project activities and findings were discussed at the Tennessee Solar Summit, held in Chattanooga on April 10-11, 2013.

Problems Encountered:

Budget and time constraints limited the survey activities. As a result, survey distribution was limited to a targeted population of 100 key stakeholders. The survey, since it included human subjects, also required IRB approval from the university's IRB review board. These challenges, however, ultimately proved beneficial to the students. Class participants had to establish a project budget, learn about and discuss research ethics, and develop a research approach that met IRB guidelines – real world lessons often absent from typical classroom experiences.

Because of the technical nature of the project, it was important to have key industry stakeholders participate in the local forum. In order to accommodate these participants, the class elected to have a lunchtime presentation. While this approach did help attract important industry representatives, it may have also limited participation by the general public. In order to reach a wider audience, the students have agreed to participate in additional meeting and have contacted the local Rotary and Kiwanis clubs about presenting at their regular meetings.

Program Continuation and Sustainability:

The DOE grant, if funded, will continue project activities for an additional 2.5 years.

TN-SCORE, after reviewing Asa Roy's research, has also expressed interest in expanding their outreach programming into Cocke County.

Conclusions and Recommendations:

Based on the findings in Cocke County, there appears to be considerable potential for solar development in Appalachian Communities. Residents, despite their historical connections to conventional energy resources, appear willing to embrace solar technologies and enthusiastic about renewable energy

strategies. Residents, however, need additional education about the realities of these technologies in order to make informed decisions. These communities will also require additional trained workers to install and maintain these systems.

Cost Share

Dr. Ezzell committed approximately 70 hours to this project for a total match of \$4,000, which fulfills the committed cost share for the University of Tennessee.

Appendices:

Project photos
Project presentations
Forum participants
UT IRB review form
Cocke County Solar Survey questionnaire
Survey football drawing card
Survey results
Course syllabus







