

Energy Education and Training Programs at Frostburg State University



Hilkat Soysal & Oguz Soysal

Renewable Energy Center
Department of Physics and Engineering
renewable@frostburg.edu

Renewable Energy Center
<http://www.frostburg.edu/renewable>

RENEWABLE ENERGY CENTER

Committed to promote the use of renewable energy resources available in Western Maryland and the surrounding region by developing educational activities, research projects, industrial partnership, and community outreach programs

Major Activities



- **2006-2007** Residential wind and solar energy demo system “WISE” sponsored by Maryland Energy Administration
- **2006-Today** Community information meetings, web site, and publications
- **2007 September 14-15** Renewable Energy Symposium and Expo hosted at FSU
- **2007-2008** FSU WISE Certified Education Program sponsored by Appalachian Regional Commission (ARC)
- **2008** North American Board of Certified Energy Practitioners (NABCEP) approves FSU as entry level courses and entry level certificate exam
- **Electromagnetic Pulse (EMP) Protected Modules Powered by Renewable Energy** (in collaboration with Instant Access Networks), Sponsored by MTECH MIPS Program,
Phase -I 2008-2009 **Phase II 2009-2010**
- **Sustainable Energy Research Facility (SERF) Construction, Equipment, and Staffing**, Federal funding obtained with the assistance of Maryland Congressman Roscoe Bartlett (R-6th)
Phase -I 2008-2010 **Phase II 2009-2012**



WISE Demo System was built in 2007 by 100% Local Workforce!



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WISE Education Program

Funding: Appalachian Regional Commission

Goals

- Increase the availability of qualified workers in rural areas
- Help healthy development of small business in residential wind and solar energy applications
- Educate the community about wind and solar energy to make better decisions

Structure of the WISE Education Program

Design, Installation, and Maintenance of Residential PV and Wind Generation Systems

- **8-week online course** (4 class-hour equivalent material posted every week)
- **3-days on-site, intensive hands-on training** (22 class hours)
- Optional NABCEP PV Entry-level exam given on the last day of the on-site part

Online Curriculum

Week	Topics Covered
1	Electricity Basics
2	PV and Wind Markets and Applications
3	Solar Energy Fundamentals and PV Module Characteristics
4	Wind Energy Fundamentals and Turbine Characteristics
5	Residential Generation Types and Components
6	System Sizing and National Electric Code
7	Mechanical Design Considerations
8	Safety Basics, OSHA Requirements

On-site Training



- PV markets, applications, and manufacturing
- PV Module Characteristics and Performance (Lab)
- Installation of a small grid-connected PV system (Lab)
- Wind Turbine Characteristics and Performance (Lab)
- Small Battery Backup Wind Generation System (Lab)
- Site Assessment
- Inspection of residential generation systems
- National Electric Code
- Policies and regulations related to residential power generation

Hands-on Activities

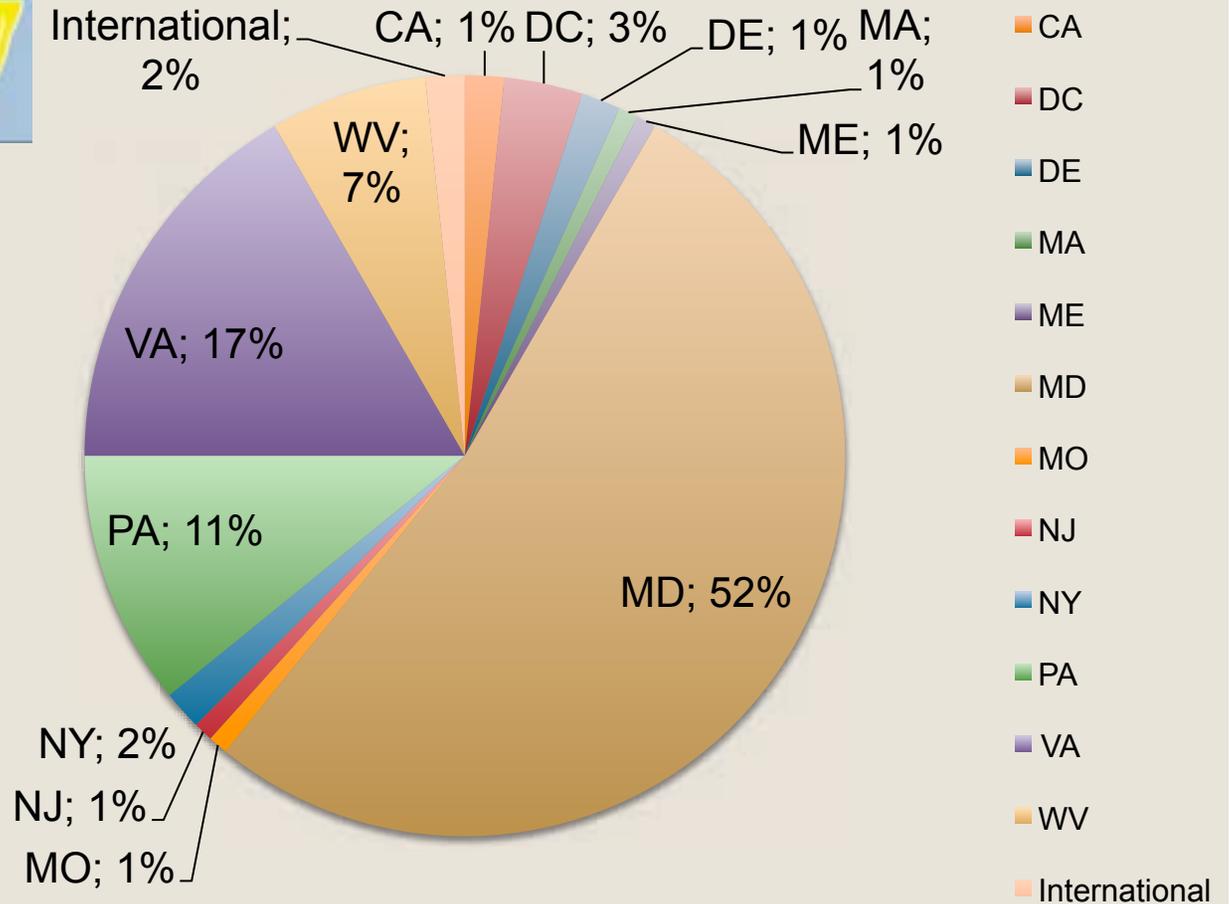


Enrollment

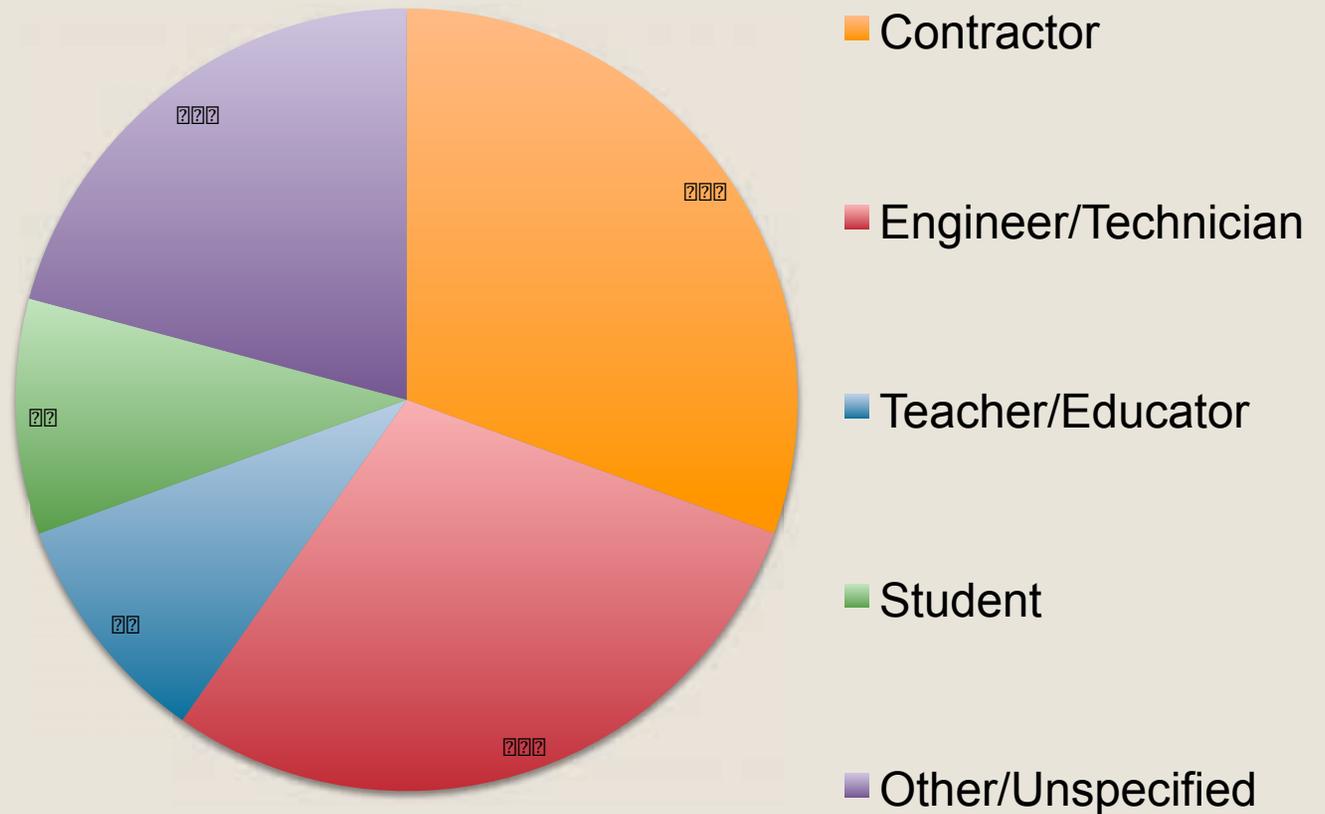
- Spring 08 Enrollment: 31
 - Online: March 31 - May 23
 - Hands-on: May 29 - June 1
- Fall 08 Enrollment: 41
 - Online: October 13 - December 5
 - Hands-on: December 12 - 14
- Spring 09 Enrollment: 48
 - Online: March 30 - May 24
 - Hands-on: May 29 - 31
- Fall 09 Enrollment: 48
 - Online: October 12 - December 4
 - Hands-on: December 11 - 13

Geographic Diversity

Total enrollment in three sessions: 120



Enrollment by Occupation





NABCEP Certificate of Knowledge Exam

Frostburg State University is an approved provider of the North American Board of Energy Practitioners (NABCEP) to offer PV workshops and administer the PV Entry Level Certificate of Knowledge Exam

The NABCEP Entry Level Certificate Program is designed for those individuals wanting to get into the solar field; it is a way for them to show they have achieved basic knowledge comprehension and application of key terms and concepts of photovoltaic (solar electric) system operations.

Fall 2008: 25 took the test, 13 passed

Spring 2009: 40 took the test, 36 passed

Fall 2009: Registration open, test will be given on December 13





SERF Project Phase I

- Construct Sustainable Energy Research Facility (SERF) at FSU to be used as home of the **FSU Renewable Energy Center** for research, education, and outreach programs on renewable energy applications.
- SERF will be a residential type building of approximately 5000 net square feet supplied by renewable energy sources providing sustainable heating, cooling, and electric power.
- The facility will also serve as an affordable example of self-sufficient off-grid building for individuals such as homeowners, farmers, or entrepreneurs who seek energy security in Western Maryland or similar geographic locations.



Features



- Residential type, one story, ~5,000 SQF
- Off-grid, energy efficient, green building in accordance with LEED
- Powered primarily by wind, solar PV and solar thermal unit and geothermal units
- Various wind and solar energy products displayed in and around the building
- One large multi-purpose hall to be used for research, education, outreach activities and public visits
- One separate lab space for control and monitoring equipments and R&D projects

Indoor Showroom/ Outdoor Expo

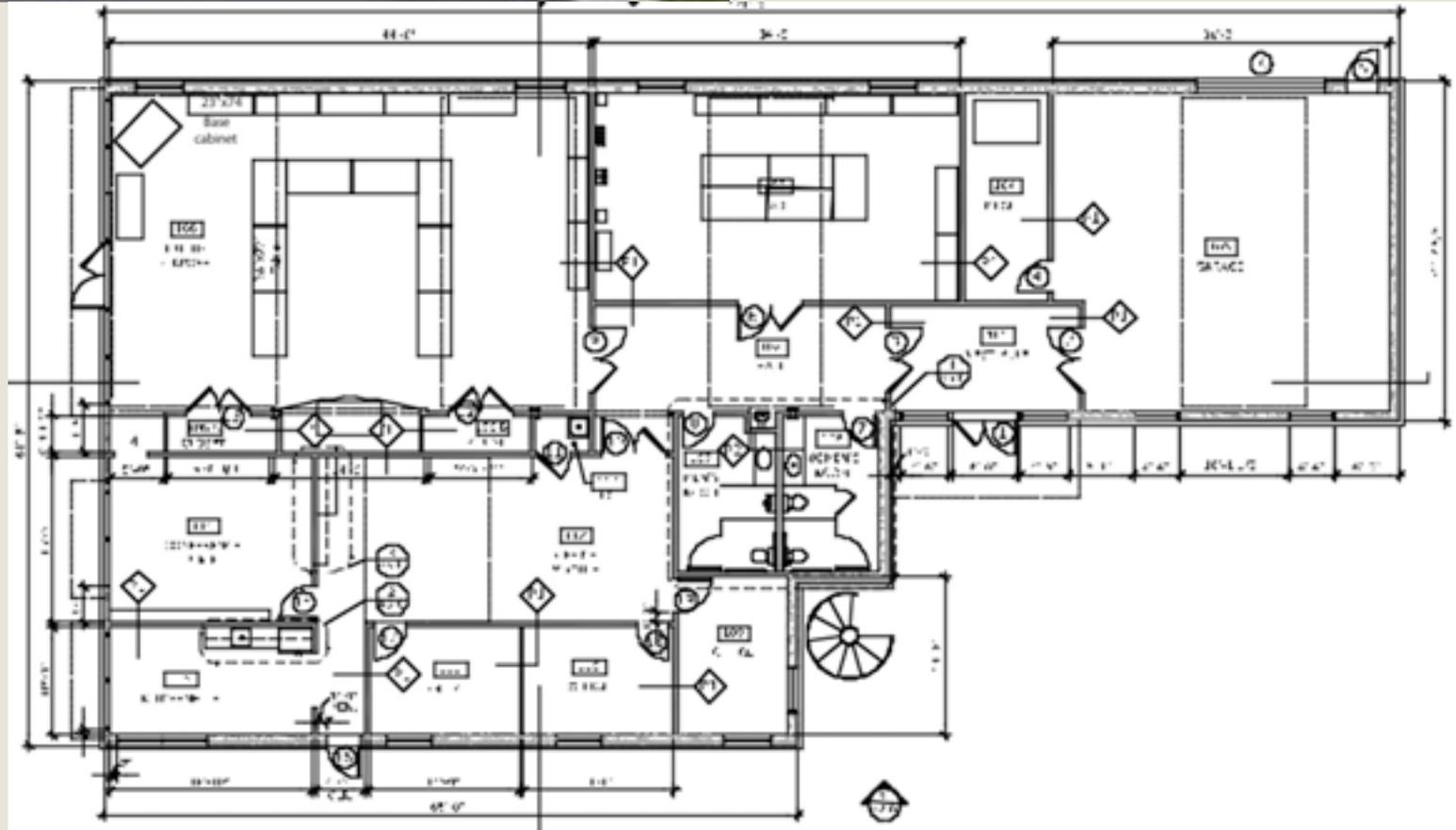
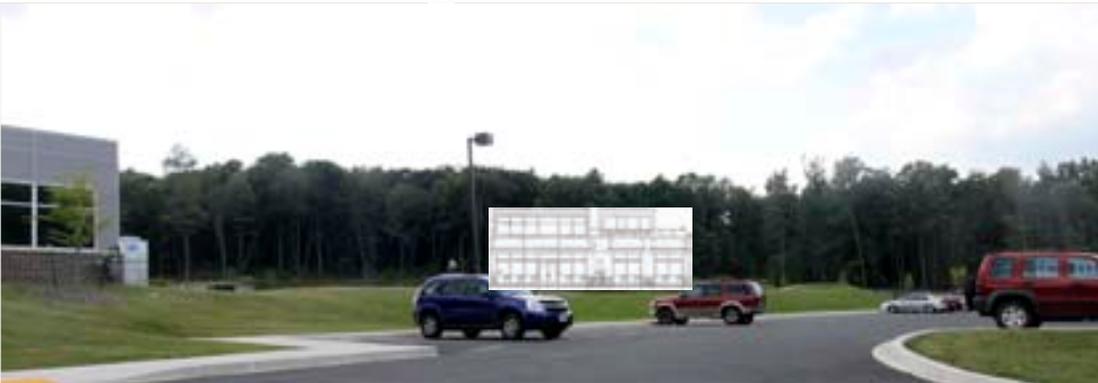
- Various renewable energy products will be displayed in the Multi-Purpose Hall
- Larger items such as wind-turbines, solar trackers, solar shingles, sun-slates, etc will be displayed outside of the building
- Most displayed products will be operational
- Real-time readings will be displayed on monitors in the multi-purpose hall

Site Location



Renewable Energy Center
<http://www.frostburg.edu/renewable>

Architectural Design



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SERF Project Phase II

Funding: Federal Appropriation obtained with assistance of MD Rep. Roscoe Bartlett

Timeline: October 1, 2009 - September 30, 2012

Purpose:

- Provide funding to initiate a research program in the Sustainable Energy Research Facility (SERF).
- Purchase equipment, supply, computer hardware, and software; and hire personnel such as researchers, graduate assistants, and undergraduate student interns.

Scope of SERF Phase II

- Study of the effectiveness of sustainable energy resources in the Appalachia.
- Collect data at SERF for further processing and analysis.
- Use database for modeling, optimal design, and control of integrated renewable energy supply systems.
- Develop design examples and case studies for optimal use of renewable energy resources for grid-independent, secure energy for residential, agricultural, and commercial communities.

An Example of Small Business Partnership:

EMP Protected Microgrids Powered by Renewable Energy

- Partner: Instant Access Networks (IAN)
- Funding: Maryland Technology Enterprise Institute (MTECH) Maryland Industry Partnerships (MIPS) program
- Phase I: 2008 - 2009
- Phase II: 2009 - 2010





Acknowledgement



The support and cooperation of the following is gratefully appreciated

- Congressman Roscoe Bartlett (MD 6th)
- US Department of Energy
- Maryland Energy Administration (MEA)
- Appalachian Regional Commission (ARC)
- Maryland Technology Enterprise Institute (MTECH-MIPS)
- Instant Access Networks (IAN)
- FSU: Jonathan Gibraltar, President; Stephen Spahr, Vice President
- BP Solar North America
- Solar Energy Industries Association, MD-DC-VA Section (MDV-SEIA)



For More Info

- Visit:

<http://www.frostburg.edu/renewable>

- Email:

renewable@frostburg.edu

Thank you!

Hilkat Soysal - Oguz Soysal