

PROJECT
facts

The Energy Systems Laboratory

The Energy Systems Laboratory (ESL) is a partnership of the South Carolina Institute for Energy Studies (SCIES) and Clemson University Facilities. It is a multi-disciplinary education and research facility focusing on all aspects of energy generation and energy management. The entire Clemson University Campus serves as the basis for the Energy Systems Laboratory.

Project Site:

Energy Systems Laboratory

Clemson University
Clemson, SC

Project Partners:

ASHRAE
Capstone Turbines
Dantherm Inc.
Flexible Technologies
GE Lighting
Johnson Controls
ONDEO Nalco Company
Solar Turbines
Spirax Sarco
Square D/Schneider Electric
Trane Company

The Objectives of ESL:

- Provide opportunities for students to gain hands-on experience with state-of-the art equipment and energy management issues.
- Provide real-time acquisition of energy data and equipment performance data for simulation, modeling, and economic analysis.
- Provide access to a virtual energy laboratory over the Internet, including access to real-time performance and energy data.
- Develop courses of instruction, including elective courses in academic departments, professional seminars, industry sponsored and taught short courses, workshops and conferences.
- Develop externally funded advanced energy research programs that support graduate education.
- Develop Industrial partnerships for developing, testing, and demonstrating advanced energy systems and components.

Opportunities at the ESL:

Clemson University has diverse expert faculty and students eager to be engaged in relevant energy technology. Workshops, short courses and lectures all contribute in the short term to the educational mission. This mission can be enhanced by direct interaction with State industry. The ESL industrial opportunities are:

- **Research** - conduct applied or basic research in the lab,
- **Prototype Testing** - install, monitor and evaluate equipment in an actual operating environment,
- **Project Work** - engage professors and students from all disciplines to assist developing major project plans and,
- **Strategic Energy Planning** - develop long term energy plans supporting business plans and benchmarking against the industry.



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CONTACT POINTS

Robert Leitner

Director
South Carolina Institute
For Energy Studies
400 Klugh Avenue
Box 345711
Clemson, SC 29634-5711
864-656-2267 phone
864-656-0142 fax
rleitne@clemson.edu

Jeffery T. Hinson, P.E.,

Director, Utility Services
Clemson University
University Facilities
Klugh Avenue
Box 345801
Clemson, SC 29634
(864) 656-7300 phone
(864) 656-0793 fax
jhinson@clemson.edu

History: In 1996, a strategic plan for a new Central Energy Facility was developed for Clemson University by the University Facilities Department. Included in this plan, was the desire to bring advanced efficient energy systems to the Clemson University campus. Integral to the plans was a “vision” to develop on campus, an energy laboratory that would be a hands-on learning facility. This vision “fit” directly into Clemson’s desire to be a leading land grant University in technology development. Combining these ideas with the unparalleled growth in South Carolina’s energy needs resulted in the ESL.

The ESL now includes a network of computers with access to virtually all equipment in the Clemson University power plant for students to monitor and analyze real time data. This data is now being put into a “virtual lab” and will be made available for remote access by students on the Internet.

Three gas turbines represent the first advanced technology to be integrated into the Energy Systems Laboratory. The Lab has access to the operating data from all three of the gas turbines (SOLAR Mercury 50, SOLAR Taurus 60, and Capstone 30kW Micro-Turbine). In addition, the ESL has access to data from pumps, compressors, chillers (centrifugal and absorption), HRSG plus fuel handling equipment.

Future:

The ESL, its partners and programs will continue to bring the latest energy related technologies to the Clemson campus. This will allow all ESL educational programs to focus on the most current approaches to the many energy problems facing our Country.

EXAMPLES OF RESEARCH PROJECTS:

Comparative Study of Flexible Ducting

Jody Burgess, Research Assistant
Submitted to Flexible Technologies, Inc.

Evaluation of Solvent Alternatives for Fabric Bonding Process

Charles H. Gooding, Ph.D., P.E., Principal Investigator,
Department of Chemical Engineering, Clemson University
Submitted to Flexible Technologies, Inc.