

GRIDED

The Center for Grid Engineering Education

2014 Progress Report

In 2013, the Department of Energy (DOE) awarded to EPRI a project known as Grid Engineering for Accelerated Renewable Energy Deployment (GEARED), an educational initiative to develop and train the next generation of power engineers so that they can help shape the electric grid of the future. In response, EPRI created GridEd—The Center for Grid Engineering Education, which is comprised of EPRI, our university partners (Georgia Technological Institute, University North Carolina Charlotte, Clarkson University, and University of Puerto Rico Mayaguez), and utility and industry sponsors.

Leveraging the Industry

Launched by a five-year, \$4.2 million investment from DOE, along with a cost-share commitment from 14 sponsoring utilities and 4 university partners, GridEd is poised to invest \$6.4 million dollars into power engineering education and workforce development through 2018. GridEd leverages electric industry research through EPRI and university engagement to educate a future electric grid workforce. The objective is to empower new and continuing education students not only to become competent and well-informed engineers but also to participate and influence major technological, social, and policy decisions that address critical global challenges. Additionally, GridEd connects its utilities, universities, and students with the larger GEARED network consisting of an additional 12 universities, 8 utilities, 13 industry representatives, and 2 national labs. Collaboration within the GEARED network consists of shared student conferences, innovation boards, and networking events as well as three working groups focused on university curriculum development, training programs for practicing engineers in the utility industry, and professional development of university faculty.

GridEd Affiliate Universities
Akron University
Buffalo State
Case Western Reserve University
Clemson University
Lawrence Technological University
North Carolina State University
Rensselaer Polytechnic Institute
St. Mary's University - San Antonio
State University of NY (SUNY) New Paltz
Syracuse University
University of Alabama Birmingham (UAB)
University of Louisville
University of Michigan Ann Arbor
University of Nebraska
University of Texas - San Antonio
Worcester Polytechnic Institute (WPI)

Affiliate Universities

One of the most exciting aspects of GridEd is that utility sponsors can nominate two affiliate universities to join the consortia, expanding our reach and emphasizing power engineering education at the regional and local levels. In 2014, GridEd welcomed 16 affiliate universities, fostering new and enhancing established utility-university connections. An initial assessment of power engineering curricula among partner and affiliate universities has commenced, led by the University of North Carolina, Charlotte, and Clarkson University. In coming years, course content developed by GridEd will be dispersed to affiliate universities through tech transfer events and seminars. Furthermore, by affiliation with GridEd, students at affiliate universities have additional opportunities to engage in power engineering through the GridEd Student Innovation Board and GEARED student conferences.

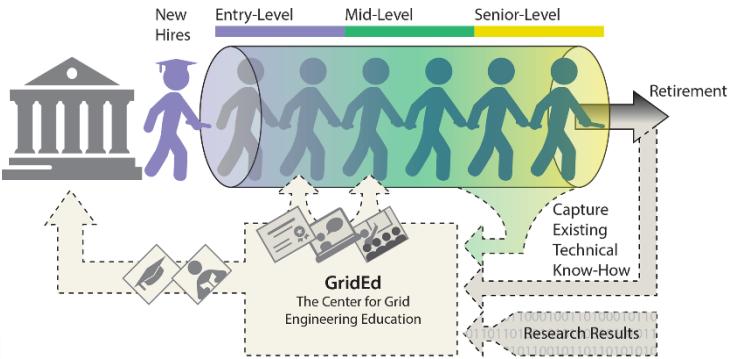
Short Course Tutorial Series

In 2014, GridEd launched its four-course tutorial series as a first step in addressing the educational needs of practicing engineers. These first four courses represent an expanding library of short courses, which provide training programs that enhance the understanding of analytical procedures, industry practices, and emerging technologies for electric power

system planning, design, and operation of present and future electric grids. Additional short courses are in preparation. A multi-semester course has been initiated to address fundamentals of electric power systems, which are essential to all engineers who want to upgrade professional skills, supplement their traditional college education, and/or obtain professional development hours.

Feedback from Short Course Evaluations

- *"I liked the real example discussion, and the professional environment."*
- *"Overall the course was very good and the instructor as obviously very knowledgeable on the topics discussed."*
- *"Good balance of 'textbook' theory and practical application/experience and case studies."*



Through a survey given to GridEd utility sponsors, an initial gap assessment of utility industry needs was conducted. Based on this initial gap assessment, four short courses were developed and offered in 2014 resulting in 59 attendees who received a total of 848 professional development hours. All GridEd courses are open to public and available for registration at <http://grided.epri.com> as they become available.

2014 GridEd Short Course Tutorial Series Topics

- Distributed Storage and Generation Technologies & Applications
- Electric Power Distribution Systems
- Dynamic Distribution System Modeling
- Business Case Analysis in the Electric Utility Industry

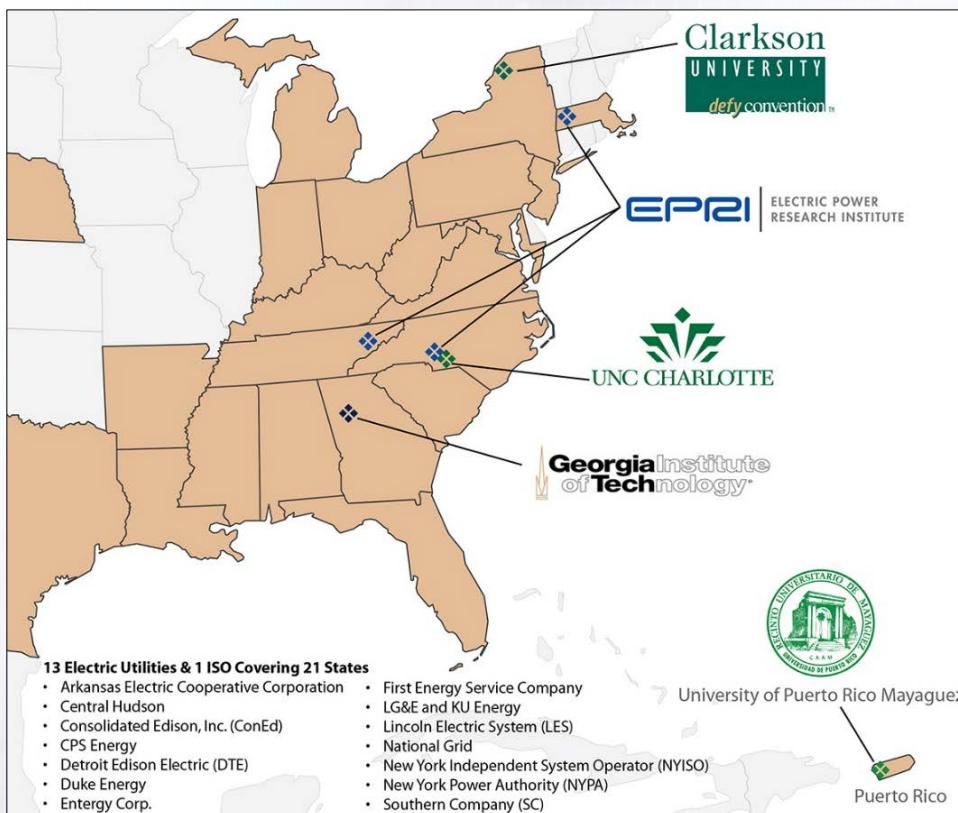
GridEd Strategy and University Curriculum Design

The overarching goals and strategy of GridEd are continuously reviewed. Updates include:

- 1) To provide an educational experience to traditional students at the undergraduate/graduate level as well as industry professionals on all issues facing the electric industry, including renewable generation.
- 2) To foster collaborative interaction with the electric utility industry, power and energy manufacturers, and electric industry consultants through participation in research projects and design of the educational programs for their workforce.
- 3) To provide comprehensive information and incentive to get involved in the smart grid and energy issues to the general public, potential and current students, current industry practitioners, and professionals outside the engineering domain.
- 4) To design and implement a sustainable business model to support the long-term impact of GridEd and to foster strong ties with the other GEARED consortia, professional associations like IEEE, international organizations whose goals are aligned with the GridEd, and other entities of interest.

The University of North Carolina, Charlotte, and Clarkson University spearheaded an inventory of power engineering courses at both the undergraduate and graduate levels between the four partnering universities of GridEd. Select findings from the inventory include (among others):

- A requirement for a power area course for all electrical engineering undergraduates at each university.
- Relatively new course additions on non-traditional energy sources at each university covering a broad range of content.
- A two-semester sequence of courses in power systems at each university (a three-semester sequence exists at UPRM).
- A wide variety of advanced courses at the graduate level are offered in three traditional categories/tracks: (1) Systems, (2) Machines and Drives, and (3) Power Electronics.
- Between the four universities, there are 15 courses offered in the Power Systems track, two in the Machines/Drives track, and three in the Power Electronics track.



Summary of Other 2014 Outputs

- 7 Univ. Courses Under Development
- 4 GEARED Networking Meetings
- 2 GridEd Advisory Workshops
- 2 Seminars in Puerto Rico
- 1 Affiliate University Webcast
- 1 DOE Review Meeting
- 1 GEARED Student Conference
- 1 International Utility Workshop
- 11 GEARED Coordination Calls
- 17 GridEd Planning Calls

GridEd Focus Areas for 2015

- Additional Short Course Offerings
- New/Revised University Courses
- Fundamentals of Power Course
- Student Engagement via Conferences and Innovation Boards
- K-12 Outreach

For More Information:

<http://grided.epri.com>;
Thomas Reddoch - treddoch@epri.com;
Steven Coley - scoley@epri.com