

GridEd Generates Pipeline of Power Engineers

The workforce of the electric power industry is experiencing a sea change on several fronts. This rapid change makes it difficult for universities and utilities to keep students and employees, respectively, abreast of new grid technologies. Furthermore, the engineers and technicians who have kept power systems operating for decades—the *baby boomers*—are retiring, taking their tribal knowledge with them—a career’s worth of institutional knowledge and specialized skills that must somehow be captured and passed to their successors.

How can the industry leverage the knowledge and expertise of an aging workforce while preparing the next generation of power engineers to tackle the challenges of integrating distributed energy resources, along with other new technologies, into the grid?

In 2013, The U.S. Department of Energy (DOE) launched its Grid Engineering for Accelerated Renewable Energy Deployment (GEARED) program, as part of DOE’s Sunshot Initiative. As one of a handful of organizations to be awarded a five-year GEARED grant, the Electric Power Research Institute (EPRI) created the Center for Grid Engineering and Education (GridEd) “to inspire, develop, and train the current and next generation of electric power engineers and professionals to prepare for the requirements of the grid of the future.” This uniquely collaborative initiative pairs the electric industry’s expert knowledge with engineering programs at universities.

Mutual Need, Mutual Benefit

In consultation with 20-plus participating utilities, GridEd works with seven partner universities to develop curricula that reflect the current and future needs of the industry. “GridEd offers a mutual benefit for universities and utilities,” said Tom Reddoch, GridEd program director and a senior technical executive at EPRI. “Utilities have a huge stake in the education and training of engineers who will design, operate, and maintain the modern power grid.”

GridEd utilities share with universities their decades of research on the integration of renewable resources and other new technologies into the grid. They also bring seasoned utility engineers to the table to identify educational gaps, recommend curriculum updates, and sometimes serve as instructors. Their work has helped revise eight courses and develop seven new courses at partner universities in the eastern U.S., impacting 500 students. In 2016, GridEd expanded its scope into the western U.S., and similar collaboration is underway in that region as well.

A key aspect of the program is the sharing of the new and revised course materials with 29 affiliate universities selected by the participating utilities. “Utilities tend to hire locally,” said Reddoch. “Typically, more than 75 percent of their workforce comes from colleges and universities in their region. The affiliate program gives them ready access to a pipeline of qualified engineers with the latest knowledge and skills.”

That’s the strategic intent behind the participation of Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E and KU) in GridEd. The energy company is helping the University of Louisville, a GridEd affiliate, to introduce more advanced topics and new courses.



From graduation caps to hardhats, GridEd is enabling universities to prepare students to become the new generation of power engineers as the existing workforce reaches retirement.

Challenge

An aging utility workforce is taking its technical know-how into retirement, just as the modern grid is demanding new skills and innovative thinking. Universities are under pressure to prepare a new generation of engineers to meet that growing industry need.

Solution

EPRI’s GridEd program addresses the intersecting needs of utilities and universities for power engineering programs that will produce a pipeline of qualified workers to design, operate, and maintain the electric grid of the future.

Results and Benefits

Utilities have greater access to a cadre of qualified, tech-savvy engineers, while universities attract top students and improve job prospects for their graduates. GridEd also offers opportunities for students to engage in industry activities, further enhancing their education and employability.

"As a result of our participation in GridEd, we anticipate a better, more qualified pool of candidates," said Dr. Nick Jewell, electrical engineer/scientist in Research and Development for LG&E and KU and the company's GridEd advisor. "By investing locally in the educational process, we can look forward to hiring strong candidates with local connections." Jewell is also working with the university to develop a certificate program in power systems, which would give electrical engineering graduates an additional credential that qualifies them for jobs in the utility industry.

Student Engagement

Engineering students at GridEd universities not only study the modern power grid but also play a role in its evolution. "By giving students opportunities to learn about the latest trends, issues, and technologies, we can attract the best and brightest to the evolving power industry," said Steven Coley, GridEd program manager and a senior project engineer at EPRI.

Each partner and affiliate university can nominate up to two students to serve on the GridEd Student Innovation Board (SIB). The Board members serve as curriculum advisors and as liaisons between GridEd and their fellow students and campus organizations. They also promote student participation in power industry activities and conferences through design competitions, research projects, and presentations.

Dr. Insu Kim served on the SIB while earning his Ph.D. at the Georgia Institute of Technology. As a student, he presented research on the impact of renewable energy resources on urban distribution networks at the Solar Electric Power Association's 2014 Utility Solar Conference. Now an assistant professor in electrical engineering at Alabama A&M University, Kim continues to research the smooth integration of renewables, particularly solar photovoltaic and wind, into power systems.

Kim encourages his students to take advantage of similar opportunities "to share their ideas through papers and presentations, sharpen their communication skills, and tackle engineering problems before they go to the field."

Ryan Yakush took a different career path, using his Power Systems concentration at Clarkson University to prepare for an engineering position in electric distribution planning at Central Hudson Gas & Electric Corp.

"Emerging technologies are bringing a challenging component to the industry," said Yakush. "For example, my job requires knowledge of not just power system principles but also signals and electronics. At Clarkson, I was exposed to a wide variety of power systems topics, as well as practical experience in solving engineering problems."

As Central Hudson's GridEd advisor, Yakush now has an opportunity to "pay it forward." Utility advisors provide strategic direction, input, and work with local universities to improve their curricula and engage students in projects and conferences.

"Utilities need a viable workforce. Universities need a viable curriculum."

*-Tom Reddoch,
GridEd Program Director, EPRI*

Cara Chacko, a graduate of University of North Carolina at Charlotte (UNCC), points to the collaboration between academics and industry as an important aspect of her education. "The faculty needs to have the resources to be up-to-date on the industry," said Chacko. "My professors were very aware of the latest research into smart grid systems and how it's related to real-world technology."

While at UNCC, Chacko researched integrating renewable resources with a control system. Now an engineer in Duke Energy's Technology Performance Optimization Department, she is working to standardize grid-management systems into a common software platform across the utility's geographic service areas.

A Sustainable Approach

GridEd is laying the foundation for a new era of collaboration between electric utilities and universities. As the program nears the end of its charter, EPRI is focused on promoting a continued partnership that, according to Reddoch, "will provide the ongoing expertise to build and maintain a reliable, safe, and efficient electric grid."

**Find more information at grided.epri.com,
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