GridEd – The Center for Grid Engineering Education

GridEd is a collaborative educational initiative consisting of the Electric Power Research Institute, seven universities (Arizona State University, Clarkson University, Georgia Institute of Technology, Portland State University, University of California–Riverside, University of North Carolina-Charlotte, University of Puerto Rico Mayaguez), and utility and industry sponsors. In 2013, the Department of Energy awarded to EPRI and its team a project known as Grid Engineering for Accelerated Renewable Energy Deployment (GEARED) which consisted of four university partners in the eastern U.S. and Puerto Rico. In 2016, the GridEd collaborative expanded to the western U.S. to form GridEd-West and three additional university partners were added. This educational initiative seeks to develop and train the next generation of power engineers so they can help shape the electric grid of the future by anticipating and fulfilling the needs of changing requirements. GridEd-East and GridEd-West leverage electric industry research to educate a future electric grid workforce by empowering 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. (http://grided.epri.com)

GridEd seeks to extend its reach and emphasize power engineering education at the regional and local levels through Affiliate University membership. Affiliate Universities are sponsored by utility and industry advisors and receive curriculum and course content developed by GridEd team partners. Additionally, students attending Affiliate Universities will be able to engage in GEARED activities via the GridEd Student Innovation Board, GEARED student conferences, and are eligible for funding of undergraduate design projects sponsored by GridEd.

Transition of the Electric Power Industry

The electric power system is beginning to change fundamentally and profoundly with the rise of distributed energy resources (DER), such as small natural-gas-fueled generators, combined heat and power plants, electricity storage, solar photovoltaics (PV) on rooftops and in larger arrays connected to the distribution system, electric energy storage, smart grid techniques, and electric vehicle options. Realizing the full value of DER investments requires a hub-and-spoke as well as potential network distribution grid that accommodates a two-way flow of electricity. Through a combination of technological improvements, policy incentives, and consumer choices in technology and service, the role of DER will become more important in the future. DER and grid-provided power do not compete with each other; they are complementary sources of power when they are jointly planned.
Today’s grid was not designed to accommodate a high penetration of DER while sustaining high levels of electric service quality and reliability. The technical characteristics of certain types of distributed generation affect the grid quite differently from traditional central power stations. To fully realize the value of DER and to serve all consumers at standards of service quality and reliability they demand, the distribution grid needs to be designed to expand its capability to accommodate DER operation. DER offers benefits to the grid in the form of reduced capacity requirements, forming a symbiotic relationship. The foundation for creating this symbiotic relationship is what EPRI is calling the Integrated Grid. Its realization requires utility technical staff that can plan and operate such a system. Therefore, engineers and planners that are tasked with developing and operating the future grid will require new and innovative knowledge. GridEd-East and GridEd-West are dedicated to fulfilling this training role.

**Objectives of GridEd**

The primary objectives of GridEd-East and GridEd-West are:

1. Leverage and incorporate high-level research already performed and ongoing within the GridEd collaboration into educational offerings.
2. Products include regular undergraduate and graduate curriculum and programs, custom-tailored short courses, tutorials, workshops, symposia, open-access courses, and other methods of delivery.
3. Priorities are set in consultation with utility and electric industry participants for the benefit and development of all aspects of their diverse workforce.

GridEd will define and develop educational offerings for all levels, including:

- K thru 12 students
- Undergraduate and graduate students
- Practicing engineers pursuing a professional master’s degree or graduate certificate
- Mature and experienced engineers seeking to understand and develop skills to address the evolving electric power system.

Training future, new, and existing professional engineers will poise the industry for success. The robust GridEd training program includes two main channels of expert knowledge. First, the results of decades of research on integrating renewable energy sources into the grid will form the GridEd courses. Second, the expert knowledge that would normally be lost by attrition (such as through retirement) will be captured by an aggressive effort to monitor the state of employees and interview them before their expertise is lost. The result will be training material in many forms suited to specifically educate college and university students—the next generation of electric industry employees—as well as existing employees. [http://integratedgrid.epri.com](http://integratedgrid.epri.com)

**Scope and Key Milestones**

- Identify utility industry needs and knowledge gaps related to distributed energy resources
- Identify gaps in existing undergraduate and graduate level power system programs, curricula, and course content
- Develop a curriculum and course materials for academic and professional training courses
- Deliver short courses on selected topics related to the evolving electric system as in the grid of the future
- Develop e-learning modules for open-access subscription
- Disseminate outreach material to K thru 12 students
- Train additional instructors from both academia and utilities to increase the number of competent trainers nationwide.

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