

THE GRID

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WELCOME TO THE GRID



From automated distribution to the advent of "Smart Grid," we're witness to one of the most innovative and evolutionary eras in the broadband, energy and telecom industries. The possibilities introduced to the market each day are endless.

Leveraging these new and exciting resources to benefit our clients is always a challenge. Regardless of how difficult the task at hand may be, our clients can rest assured the entire Finley Engineering team is dedicated to providing cutting-edge solutions that continuously exceed expectations.

We're committed to this principle — we have been for the last 50 years, and will continue to be for the next 50.

Enjoy this issue of *The Grid*.

Mike Socha
Manager of Transmission and Distribution Services

RETHINKING THE WAY UTILITIES DELIVER POWER

The United States' electric grid has long done what it was created to do 100 years ago — move electricity from generation points to end-use points. Over that span, however, the grid itself has seen minimal change, despite the availability of new and improved technologies.

Typically, utility companies across the nation control electrical voltage at substations. To ensure voltage levels remain the same across a distribution line, voltage regulators are arranged across the system. These voltage regulators typically operate at the highest range possible, 127 volts (based on a 120-volt base) at the point of regulation.

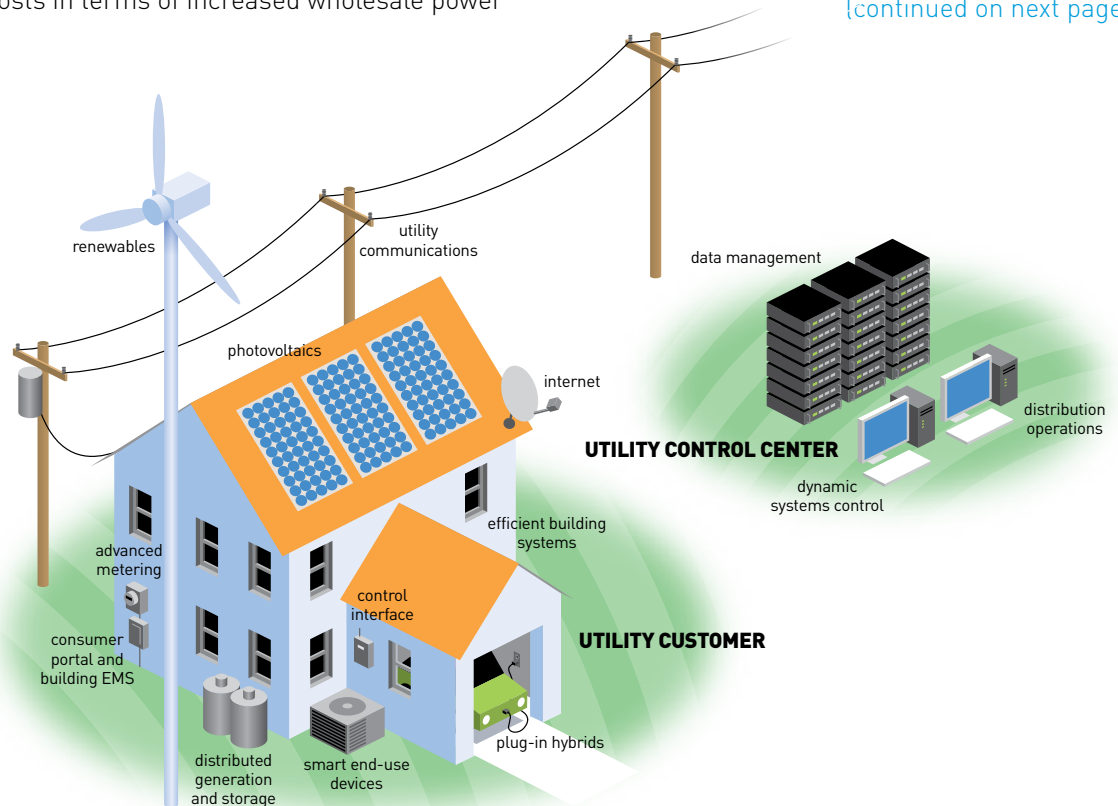
Operating at the highest range possible, however, can increase a utility's operating costs in terms of increased wholesale power

purchases, maintenance needs and equipment breakdown.

With the introduction of automated voltage regulation technology, or smart regulators, utilities are beginning to rethink the way power is delivered to customers. These smart devices can significantly increase the efficiency and reliability of an electrical system. They can also play an important role in counteracting the aforementioned operating-cost increases.

One of the many advantages of automated voltage regulation technology is that it allows regulators to communicate with each other. Through this interaction, regulators are able to work together and deliver a lower bandwidth, allowing utilities to provide customers with higher capacity.

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Additionally, utilities no longer rely on customers to become aware of voltage issues. Because these devices communicate with each other, information is relayed to a dispatch and brings awareness to any potential problems. As a result, correction of a problem can occur before large-scale effects are noticed. This real-time data can be stored and analyzed to determine what happened and determine corrective action in the future.

“Automated distribution technology is the future of America’s electric grid,” explains Mike Socha, P.E., Manager of Transmission and Distribution Services. “This technology helps utilities provide customers with optimal voltage support and minimizes power output. It can also have a significant impact on utilities’ bottom line, saving time and money on equipment and upkeep.”

During your four-year system-planning studies, Finley Engineering can assist in identifying areas to reduce construction costs where voltage cannot be maintained by reviewing automated distribution and communication possibilities.

SMART GRID COMMUNICATIONS CHALLENGES

Over the next decade, we will see some significant changes to the industry landscape. One of these changes will be the advent of smart grid, a subject that’s not going to go away anytime soon. As industry and news media continue to increase discussion around the topic, there are many aspects to take into consideration.

For example, technical smart grid applications can range from easier, less expensive customer-centric applications to more difficult and more expensive grid management, reliability and artificial intelligence applications.

One common component of all smart grid applications is the communications aspect, which can take many forms for a utility. A utility can provide its own wireless solutions using unlicensed or licensed spectrum, install a fiber optic-based network to support its requirements, or lease capacity from an existing service provider that also provides broadband services to homes of the same customers the utility is serving. These solutions work well for the customer-centric applications to serve the smart meters and

home networking requirements.

A sub-component, and very important part of the communications requirements, is the security and protocol requirements. This is especially important for grid management, reliability and artificial intelligence applications. Threats to the grid from solar or nuclear electromagnetic pulse effects are a growing concern within Congress, which introduced a “Grid Act” bill aimed at addressing threats. The bill is awaiting Senate action, having already passed the House of Representatives.

The fully functional smart grid that encompasses all of the components of smart grid is potentially gated by broadband, IP and security requirements. With multiple grid networks and divisions of the lines of responsibility, coordinating the communications requirements becomes an even bigger task than customer-centric applications. In this instance, utilities may consider partnering with regional and national commercial providers to provision and manage the communications requirements for themselves.

THE FUTURE OF POWER IN THE U.S.

Do you know what the largest interconnected machine in the world is? We’re not talking about heavy construction equipment, airplanes or even cargo ships. . . . Give up? According to the U.S. Department of Energy (DOE), it’s the United States’ electric grid.

The nation’s power grid consists of over 9,200 electric generating units with over 1,000,000 megawatts of generating capacity, connected to more than 600,000 miles of transmission lines. Rather impressive for a machine we don’t give much thought to, but depend upon to go about our daily business.

As big and impressive as this machine is, however, there comes a time when it becomes incapable of supporting projected growth and demand. By 2030, the DOE

estimates nationwide demand for electricity will grow 30 percent. Left untouched, the current electrical grid simply can’t sustain this level of demand.

A solution? Enter “smart grid.” According to the DOE, smart grid is “the electricity delivery network from electrical generation to end-use customers, integrated with the latest advancements in digital and information technology to improve electric system reliability, security and efficiency.”

From consumer homes to utility and power companies, the smart grid offers a number of benefits in electricity generation, transmission, storage and distribution. To learn more about smart grid’s capabilities, visit <http://www.fecinc.com/Finley-Smart-Grid-paper.pdf>.

FINLEY ENGINEERING FURTHERS ON-SITE TRAINING OPPORTUNITIES

Finley Engineering remains committed to furthering professional education through on-site learning opportunities and seminars. Finley recently conducted three successful training sessions — two on behalf of Carroll Electric Cooperative, Berryville, Ark., and one for City Utilities, Springfield, Mo.

Finley engineers teamed up with Carroll Electric Cooperative to host a three-day training session for field designers and stakers. The event covered a wide variety of materials and activities, from selecting proper pole size to learning about conductor applications, anchoring and code compliance. The second session, a one-day presentation about easements, included discussion of requirements and proper easement writing techniques. More than 30 individuals attended these events.

City Utilities also hosted a two-day training seminar for 11 individuals. The program focused on distribution design training for engineers and technicians who specialize in the mechanical design of overhead distribution lines. Finley

engineers presented information about structure design, conductor sag and tension calculations, guying and foundation designs.

Participants were quick to recognize the value in these training sessions, with one commenting the event was a great refresher and the materials provided are great references for young engineers and technicians.

“Nuts-and-bolts training in overhead electrical distribution design, including an emphasis on actual design calculations, was our goal,” explains David Kirby, City Utilities Supervisor — Electric T&D Engineering. “Ongoing education seminars such as these are an excellent resource for experienced professionals, as well as those who are new to the industry, to refine and sharpen their skills.”

For more information about future Finley Engineering education opportunities, contact: Phil Carroll, Finley Engineering, 104 East 11th Street, Lamar, MO 64759. Phone: 417-682-5531; email: p.carroll@fecinc.com



Q&A

Q What is the difference between the supply space and the communication space on a pole?

A Without being familiar with National Electric Safety Code (NESC) and OSHA rules, one might think there is no difference between the two, when in fact there is.

The supply space is the vertical space reserved on a pole for the electric supply facilities. This area is usually located near the upper portion of the supporting structure. Only qualified personnel who meet NESC and OSHA rules are authorized to work in this area of the pole.

The communication space is the vertical space located below the supply space on a pole that is assigned to communications attachers. Though workers are required to meet NESC and OSHA rules to work in this area, the qualifications are not as strict as those in the supply space.

Separating the supply space from the communication space is the communication worker safety zone. This area is considered neutral space and consists of the space from the lowest supply conductor or equipment on the pole to the highest communication cable or equipment. This space varies depending on the voltage of facilities in the supply space, but gives workers the ability to maneuver in a safe manner around the pole.

For safety reasons, knowing how to identify the distinction between these areas is very important when working on or around energized facilities.