

Building a better telecom system

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Hurricane Katrina helped University of Texas professor, Alexis Kwasinski, formulate a new plan for the U.S. telecom system: a decentralized power architecture that would have kept the lights and phones on in New Orleans. Kwasinski maintains that a microgrid-based power plant with its own local power sources and independent control would be more dependable, efficient, and cost effective than traditional telecom power systems. Microgrids would also be a quick and inexpensive way to include renewable energy sources for both existing and developing systems.

"There has been surprisingly little research on disaster damage and restoration of telecommunications systems," says Kwasinski. "My survey of the Gulf coast after Katrina showed how devastating a single downed line or incapacitated substation can be. The answer is diverse power input. You integrate different types of local power sources with diverse energy delivery infrastructures through multiple-input converter modules."

Since the communications industry power standard is direct current (DC) local networks, Kwasinski is exploring DC generation systems using a microgrid-based telecom power plant with a modular distributed architecture. Energy would come from a mixture of renewable energy sources, microturbines, fuel cells, and interconnection to the existing utility grid. Converters in secondary distribution frames would isolate short circuit currents. Since the utility grid is a secondary source, the microgrid would be protected against the grid's surges and failures.

The savings would be generous. Microgrids could "sell" excess power to the utility grid. Costs decrease because of reduced energy storage, less down time, equipment operating at maximum efficiency, lower hardware expense, and optimal power input control based on energy costs.

"I think the most exciting aspect of the research is how flexible this approach is," says Kwasinski. "It works for developing countries who can add components to the system as they can afford it. Existing systems can easily be retrofitted with a microgrid system operating as a secondary distribution method. Small devices like solar panels and windmills can be added ad hoc, making for a painless transition to renewable energy at a competitive cost."

Source: University of Texas at Austin

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