POWER SHIFT

SCI-TECH SCENE | Old name behind new design for IIT electricity delivery

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Alexander Flueck (left) and Mohammad Shahidehpour discuss their design for a new electrical distribution grid for the IIT campus. | KEITH HALE~SUN-TIMES

Robert Galvin, the son of Motorola's founder who ran the company for 30 years, has started a not-for-profit venture making Chicago "ground zero" for a new U.S. electrical system run by entrepreneurs.

Galvin, 86, was jolted by the reality of this country's outmoded electrical grid six years ago when his wife got stranded in New York during a blackout that left 40 million people in eight Northeastern states in the dark.

Robert Galvin

"I said, 'Someone needs to do something about this,' " said Galvin, who has poured his own millions into developing a business plan and technologies in the last five years.

The latest move is a partnership between the not-for-profit Galvin Electricity Initiative and the Illinois Institute of Technology.

IIT is converting its South Side campus into a "Perfect Power" system, making it the model for Galvin's vision of small electrical grids that would serve local communities.

The four-year project at IIT requires the university to upgrade its two ComEd electric substations and to upgrade and attach smart switches to the seven electrical-service loops that feed electricity to campus buildings, said Joseph Clair, director of campus energy and sustainability at IIT. The system is expected to decrease power demand by 20 percent, Clair said.

The smart switches will also instantaneously relay to humans what's going on in the electrical grid, allowing power to be automatically redirected in case of an emergency.

The $12 million project is being funded with a $7 million construction and research-and-development grant from the U.S. Energy Department and the remainder from IIT. The energy savings are estimated at $1.3 million a year.

Galvin realizes the existing electrical grid and overhead power lines won't go away instantly, but he looks forward to entrepreneurs being motivated to build power systems underground, losing less energy into the air and boosting reliability.

Kurt Yeager, executive director of the Galvin Electricity Initiative and the retired president of the Electric Power Research Institute, said the smart switches are a necessary first step because today's power grid is as outdated as a rotary dial telephone.

"We're trying to set up the Internet of the electric industry," said Yeager, who argues that today's regulations give utility companies no incentive to upgrade.

Ultimately, an upgraded electricity system could even do away with the meter and rely on local power sources such as solar power, local gas turbines and other complementary sources.

The goal is to make America more competitive, Galvin said.

His next priority is to change state regulations that favor electrical power monopolies.

In January, he convened a meeting of what he called "public spirited and active influentials" to endorse principles and policy objectives to guide the new electric environment.

Indeed, the Illinois Commerce Commission has launched a smart-grid initiative. The federal government has started its own initiative, in which Galvin hopes to participate.

Entrepreneurs and major corporations are racing to join what Barron's magazine calls a "Grid Rush" to pan for some of the $11 billion the Obama administration intends to spend to upgrade the electrical grid. Some experts say it will take $10 billion each year for five years to install the latest smart meters and billing systems into the grid.

"The $11 billion that the Obama administration plans to use to upgrade the grid is an excellent start, but support cannot stop there," said Mohammad Shahidehpour, chairman of electrical and computer engineering at IIT and principal investigator on the Perfect Power project. "The key is to spend wisely on technology that will provide results. Moving into the digital era of energy infrastructure, we must teach people to use energy efficiently. Smart grid technology is the most straightforward way to do that."

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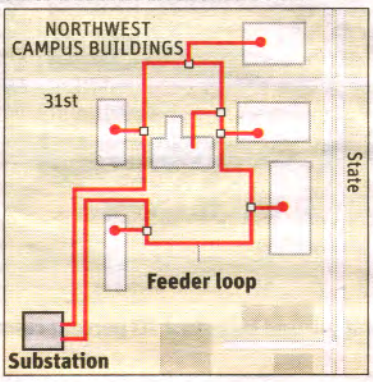
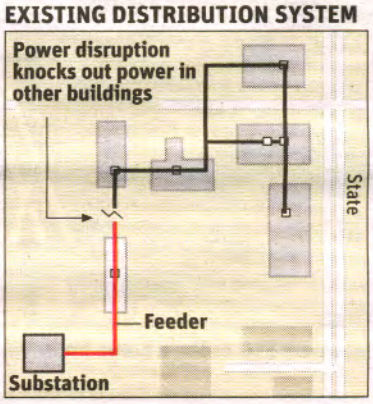
IIT'S NEW ELECTRICAL SYSTEM

Below is one of the seven planned redundant electricity loops at IIT's Main Campus. The loop structure sends electricity from one building to the next and allows the flow to automatically switch directions if a fault causes one of the buildings to lose power. This concept keeps electricity flowing to the rest of the block of buildings.

NEW DISTRIBUTION SYSTEM



EXISTING DISTRIBUTION SYSTEM



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