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UB Researchers work today on the 'electricity of tomorrow'

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October's "surprise" blizzard left thousands of people in the Buffalo area without power for days, but UB scientists say that with the implication of wireless, storm-sensing transistors, future power outages do not have to be nearly as costly or frustrating.

UB's Energy Systems Institute is researching a nanotech sensor that could pinpoint problems in an electrical utility system.

One of the many implications for the developing nanotech sensors is their ability to pinpoint the exact location of a power outage, according to researchers at UB's Energy Systems Institute.

In the recent storm, electrical crews had to go street-by-street looking for the location of the several problems causing power outages - such as a downed line or damaged power box, while many lived without electricity for days.

Sending out crews for repair is costly in both time and money, and researchers say that with the new sensors they would be able to pinpoint the problem and isolate it much faster than before.

According to W. James Sarjeant, Ph.D., UB professor and chair of the Energy Systems institute, the sensors are extremely small, yet sensitive enough to permit wireless, real-time measurements of power systems. This includes monitoring the quality and condition of the systems, alerting utility companies if they fail or are damaged.

This real-time screening would eventually decrease the likelihood of any future "snow days" for UB students, but would also allow people to stay warm during future surprise storms - with heat, electricity, gas, television and Internet.

"There's not a lot of downsides (to the new sensors)," said Albert Titus, electrical engineering professor and researcher for the project.

Titus said that there are many possibilities for a technology able to detect natural disasters such as earthquakes or hurricanes, keeping people across the county more aware of their surroundings.

Small is the name of the game with nanotechnology, and therefore the sensors are constantly being modified to be as little as possible. Some models already exist that are only two to three inches long. They would replace the huge transistors currently in use that are at least four feet tall and wide.

The main reasons the sensors are not already in place are funding and research, according to the institute's chair.

"The necessary research must be completed, four to five years, at (a cost of) five to six million dollars per annum here at UB," Sarjeant said.

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Cemal Basaran, professor of civil, structural and environmental engineering, is another researcher on the project. He said that researchers have the technology to implement the sensors, but there are other obstacles that still need to be overcome.

"You need funding and political power," Basaran said.

Researchers say that there are few, if any, doubts that the new transistors will be the future of electricity. They are tiny, intelligent, modern and much more efficient than current technology.

The technology will then advance with U.S. industry into a prototype stage, followed by a phase where it is manufactured on a large scale.

"The New York state region would benefit the most, as illustrated by out recent Buffalo storm experience," Sarjeant said.

The nanotech sensors can be implemented in many ways other than storms and power systems, he said, including any on-contact wireless monitoring of electrical systems that run on standard AC 120 volt of above power.

"Examples include refrigerators, freezers, expensive high definition television and home theatre systems, as well as home medical systems and any other extreme event response items," Sarjeant said.

Basaran said that many people still have a hard time recognizing such a groundbreaking technology, despite all of its possibilities.

"It's very difficult to get people to accept new technology. It's based on the larger picture," Basaran said.

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