

STATE OF THINGS



Remaking the Grid

Research center leads partnership to transform energy technologies.

2008
**THE YEAR
OF ENERGY.**

[AROUND CAMPUS] One day, if NC State researchers have their way, your roof-mounted solar panel or mini wind turbine could be connected to the ones dotting rooftops up and down your street and in your community. To find out how much energy you were using and generating, you'd just look at a screen in your home. Ultimately, electricity would become more stable and more resistant to blackouts and annoying flickers.



hope to develop a new model. The idea, he says, is to make it easy for consumers who generate electricity with solar panels, small-scale wind turbines or electric/hydrogen fuel-cell vehicles purchased at local retailers to connect with one another, store energy and sell the excess back to power companies, all through a transformed power grid.

"What we want is to encourage individual citizens and energy consumers, you and me, to go to the Home Depot and Walmart down the road and buy some of the new energy technologies and plug them into your home," he says.



such as Progress Energy, Duke Energy, the Tennessee Valley Authority and American Electric Power.

Work also is under way at NC State to create a master's degree program and undergraduate concentration in renewable-energy systems to begin next fall. Industry representatives will be on graduate students' committees to offer "real-world" input into the academic program.



"The idea is to give them some exposure to industry, to put some relevance to what they are doing, which we think is very important," says Mesut Baran, director of power systems in the Department of Electrical and Computer Engineering and director of the research center's education efforts. "We believe there will be quite a lot of need for technical expertise in this area as renewable energy becomes more widely adopted. Our goal is to educate the work force needed in the next 10 years."

That day could come sooner rather than later, with the help of a five-year \$18.5 million grant awarded to the university in September by the National Science Foundation. The award, along with nearly \$10 million more in institutional and industry support, is going toward the Future Renewable Electric Energy Delivery and Management Systems Center, which is investigating and developing ways homes and businesses can use, share and store environmentally friendly energy.

Researchers at other universities and organizations are working to make it easy and affordable for consumers to purchase and use alternative-energy tools such as solar panels. The research center is adding the next component, Huang says: the infrastructure and technology to allow consumers to "plug and play," or to be able to plug in a solar panel, for example, and be connected.



The research, led by the College of Engineering, could fundamentally change the way consumers use electricity, says Alex

Huang, an electrical and computer engineering professor and the center's director. Today's energy-production model depends on large, centralized facilities to produce most of the country's electricity. But researchers

The idea has garnered the financial and research support of a wide range of partners, including laboratories, universities and companies around the world. Universities in the U.S., Germany and Switzerland will assist with research and new academic programs, and at least 65 companies from six countries have committed to partner with the center, including utilities



With potential grant renewals and other assistance from industry and federal and state government, the center anticipates investing about \$40 million over the next 10 years in this research. Now located in the Partners I building on Centennial Campus, it's scheduled to move within the next two years to a new building called the Centennial Science Center. "We have to move to a renewable energy-based society," Huang says. "There are a lot of things you can do once you have this infrastructure and the information technology to manage it."

—Angie Newsome