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## Powering the Future [renewable energy at USFSP]

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## Powering the Future

A renewable energy system being tested at USF St. Petersburg is revolutionizing the power grid.

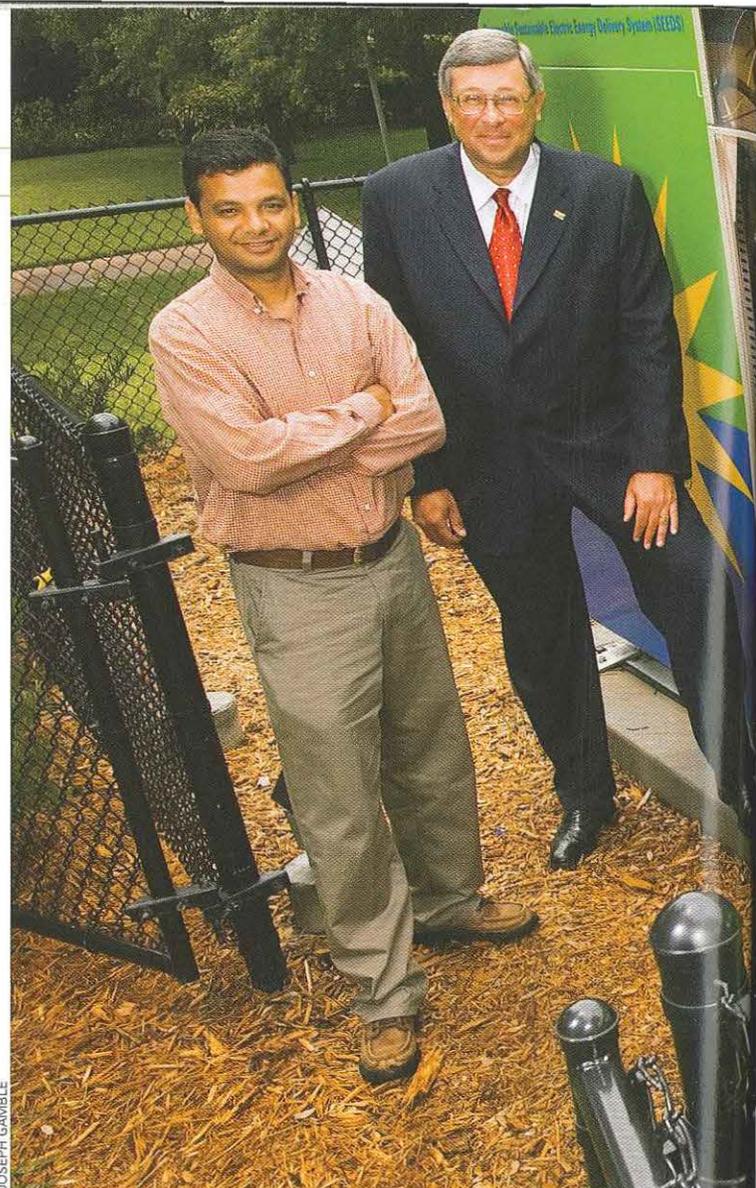
**W**HO CAN FORGET THE MASSIVE power outage that blacked out huge portions of the northeastern United States and Canada in 2003? Transportation failed, cell phone towers went out, so did the lights, the TV, elevators and the Internet. New York City shut down and much of the nation went to its knees as a cascade of events crashed the power grid.

“The continental-sized energy grid is the most complex system developed by mankind,” says Alex Domijan, professor and the director of the College of Engineering’s Power Center for Utility Explorations (PCUE). “Its growth is directly linked to our national economy and has brought us our modern era.”

Since the crash of 2003, what’s being done to transform the power grid and improve the security and quality of electrical energy distribution and reduce our dependence on oil throughout the nation? At USF, a lot is being done in the College of Engineering’s Power Center for Utility Explorations where a program called SEEDS (Sustainable Electric Energy Delivery Systems) promises to find revolutionary ways to bring the power grid into the 21st century system.

SEEDS is a renewable energy system that combines photovoltaic panels, or other renewable energy sources, to produce electrical energy from solar energy coupled with an advanced battery system to supply green energy during power system peaks.

“We need a system flexible enough to prevent blackouts, a system that incorporates renewable energy sources in harmony with conventional energy sources, and a system that encompasses the climate change issues now



JOSEPH GAMBLE

being discussed,” explains Domijan.

Domijan and colleagues are demonstrating SEEDS through a partnership with Progress Energy, the Florida High Tech Corridor and the City of St. Petersburg. Two SEEDS units were recently installed on the USF St. Petersburg campus and the nearby Albert Whitted Park. The units are gathering solar energy, converting it to electricity and storing the power in batteries where it can be used by Progress Energy anywhere it is needed.

“We want to be able to send energy back into the grid system,” explains Arif Islam, PCUE deputy director and SEEDS project manager.

The need to improve the power grid and energy distribution is becoming dire. As Domijan points out, the outdated power grid that barely dealt with the additions of air conditioning in the 1960s is being taxed by the increasing demands placed by the Internet in the 1990s. The power grid will soon have to accommodate increased demand when more people start recharging their hybrid cars.

“Electric vehicles will have to be charged quickly, and



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**Project manager Arif Islam and Alex Domijan, director of USF's Power Center for Utility Explorations, are monitoring and testing the new system.**

we can't do that from the utility grid because of the large voltage drops," predicts Domijan.

How can SEEDS help? First, the SEEDS concept and technology aids in the development of a 'smarter grid' that can redirect stored energy. Second, SEEDS technology can store the greener energy created by renewable sources such as solar, wind or ocean power—fossil fuels need not apply.

Because SEEDS energy is greener from square one and can be stored or sent elsewhere in the system, SEEDS can save a lot of money, says Domijan. Once more, he predicts that the development of the SEEDS concept and associated technology will lead to an international revitalization and revolution of energy "demand-side management" that features renewable energy use, advanced storage systems, peak load sharing, energy efficiency, lower costs and lowered CO<sup>2</sup> emissions.

"SEEDS is like a virtual power plant," explains Domijan. "The batteries and how you use them are key. Instead of building yet another coal-fired power plant, we can build more SEEDS units and create a smarter grid."

USF's PCUE is also in the business of developing the next generation of power engineers. According to Domijan, local industry is actively involved in developing the power program and includes PCUE founding board member firms, Tampa Electric, Florida Power and Light, Progress Energy, Sumter Electric, Seminole Electric, and Tampa Armature Works.

"USF is also developing the next generation of power engineering professionals, the only dedicated specialty that deals with energy issues," says Domijan.

Analysis of the performance of the two SEEDS units is now under way, says Islam, and some real data about the benefits of storing renewable energy is forthcoming.

- Randolph Fillmore