
POWERING *the* FUTURE:

Broad-based Research Program
Helps Ensure Tomorrow's
Energy Supply

by JOHN TOON

Energy. Modern economies depend on it to keep them going. But continued use of fossil fuels like petroleum and coal deplete a limited resource and create both air pollution and global warming concerns.

Researchers at the Georgia Institute of Technology are addressing energy issues on several fronts, advancing renewable energy technology, exploring potential new energy sources and making more efficient use of conventional fossil fuels – while reducing their environmental impact.

Fuel cells that convert chemical energy directly to electrical energy offer tremendous potential for using fuels more efficiently – while reducing emissions. Georgia Tech's broad-based fuel cell program, coordinated by the Center for Innovative Fuel Cell and Battery Technologies, includes everything from the tiniest micro fuel cells integrated into microelectronic packages all the way up to refrigerator-sized units for powering homes. The program is developing innovations in membranes, fuel reforming, systems integration, catalyst optimization, modeling and other key areas.

Research beneath the ocean floor has implications for both production of conventional fossil fuels and development of a potential new energy source. Gas hydrates are a solid form of methane and water found in sediment deep beneath the ocean floor. Touted as a potential energy source, the gas hydrates are a critical component of the carbon cycle affecting global warming and a potential threat to deep-sea petroleum production.

Atop Georgia Tech's Aquatic Center – built to house swimming and diving events of the 1996 Summer Olympics – photovoltaic cells produce 30 percent of the building's electricity, enough to power 70 average homes. Researchers are evaluating the long-term performance of the massive array. They are also advancing basic technology to make photovoltaic cells more efficient and less costly.

Researchers in the National Electric Energy Testing, Research and Applications Center (NEETRAC) are field-testing electric and hybrid-electric vehicles that are beginning to enter the market. Their work helps manufacturers ensure that the new systems meet real-world needs. Finally, engineers with Georgia Tech's Economic Development Institute are helping Georgia companies use energy more efficiently. They've also developed ANSI/MSE 2000, the first management system for energy. The standard is being implemented nationwide.

Energy innovations developed at Georgia Tech will help keep the world's economy moving. The articles that follow highlight this work. **RH**



David Parekh, director of the Center for Innovative Fuel Cell and Battery Technologies, holds a hybrid power source designed and built at the Georgia Tech Research Institute. It provides sustained power from a fuel cell, power storage from a battery and bursts of peak power from a capacitor.