Physicist addresses international forum on thermoelectric energy

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Energy lost from hot engines could save billions of dollars if it could be captured and converted into electricity via thermoelectric devices, Clemson University physicist Terry Tritt told scientists gathered in Dallas for the world-renowned NanoTX ’07 conference.

Tritt delivered an address at the Alan MacDairmid Memorial Nano Energy Summit on challenges in alternative energy, specifically thermoelectricity used to generate electrical energy from waste heat.

“Thermoelectric generators are currently used in NASA’s deep-space probes to convert the heat of radioactive elements to electrical energy, powering these systems for over 30 years,” Tritt said. “Thermoelectric energy conversion is a solid-state technology that is environmentally friendly. One of the more promising ‘down-to-earth’ applications lies in waste-heat recovery in cars.”

Tritt said more than 60 percent of the energy that goes into an automotive combustion cycle is lost, primarily to waste heat through the exhaust or radiator system.

“Even at the current efficiencies of thermoelectric devices, 7 to 8 percent, more than 1.5 billion gallons of diesel could be saved each year in the U.S. if thermoelectric generators were used on the exhaust of heavy trucks. That translates into billions of dollars saved,” Tritt said.

Clemson research focuses on developing higher-efficiency thermoelectric materials that could increase savings significantly. Research on the electrical and thermal properties of new materials could reduce the world’s reliance on fossil fuels and has shown promise with two classes of materials: low-dimensional systems for enhanced electrical properties and increased phonon scattering that leads to inherently low thermal conductivity.

Tritt heads up the Department of Energy’s Center of Excellence in Thermoelectric Materials Research at Clemson, one of the leading laboratories for thermoelectric materials in the world. The national center focuses on the next generation of thermoelectric materials for power conversion and refrigeration. Researchers in physics, materials science and chemistry screen promising new classes of materials in order to achieve higher-performance thermoelectric materials. DOE recently renewed the program with more than $1 million a year in research funding for the next three years.

Source: Clemson University