

Energy Utilization Research (EUR)

The mission of the Office of Energy Utilization Research is twofold. First, it is responsible for exploring and advancing emerging technologies needed in the future by end-use sectors of the economy. Second, EUR is charged with fostering invention and innovation in the private sector that could lead to energy savings or new energy sources.

The *Energy Conservation and Utilization Technologies (ECUT) Program* of EUR conducts interdisciplinary research directed toward solving problems that appear in more than one energy-consuming sector. Specifically, ECUT conducts research in the areas of combustion, thermal sciences, materials, catalysis/biocatalysis, and tribology. Emphasis is placed on technologies and processes that are well-conceived technically, that promise significant energy savings and cost-effectiveness, and that are too generic for other DOE conservation programs and private firms to pursue. The ECUT success stories summarized in this *Compendium* were selected on the basis of their contribution to expanding the knowledge base and improving the potential to realize energy savings projected for advanced technologies. Examples of successful ECUT projects in this document include:

- the RAPRENOx process that shows significant potential for reducing nitrogen oxide emissions from fossil fuel-fired combustion systems; and
- ductile ordered alloys that allow conversion technologies to operate more efficiently in high-temperatures and other severe operating environments.

The *Energy-Related Inventions Program (ERIP)* is jointly sponsored by the Department of Energy and the National Bureau of Standards and provides technical evaluation and financial support for promising energy-related inventions submitted by the general public. Successful ERIP technologies, chosen on the basis of current or projected energy savings, include the following:

- the steam turbine packing ring, a new design producing a tighter seal that can significantly improve the efficiency of utility steam turbines; and
- Alter-Break, an alternator and battery-charging system for automobiles that achieves a 10-20 percent increase in fuel efficiency.

Looking Forward

DOE's Energy Conservation Program has had a significant impact upon U.S. energy consumption. Program successes at the project level have fostered direct technological improvements as well as demonstrating to the private sector in measurable ways that energy efficiency is important on a national scale.

The need for continued efforts at the federal level to improve the nation's energy productivity remains clear despite a short-term fall in oil prices. That need rests upon compelling longer-term factors:

- Growing dependence upon oil imports once again increasingly threatens national security.
- The nation's oil trade deficit continues to drain the economy of resources that might otherwise be used to stimulate growth.
- A lag in gains of U.S. industrial productivity threatens the nation's standard of living through a declining ability to compete with foreign industry in domestic and overseas markets.