Lightweight Materials Technology Development
Reducing vehicle weight through the use of lightweight materials promises to enable major energy efficiency improvements in fullsize automobiles without compromising passenger comfort and safety. At the program's inception in 1992, lightweight metals such as aluminum could not compete with steel as the material of choice for automotive manufacturing because of their cost and forming time. After three years and $3 million of Department of Energy costshared R&D, advanced forming of aluminum sheets for auto body components achieved weight reductions of 43 percent, parts count reductions of 89 percent, forming time reductions of 77 percent, and cost reductions of 15 percent. **Projected cost savings to auto companies are about $60 million per year by 1997.**

Industrial Technologies
The Department's industrial energy activities are motivated by energy, economic, and environmental policy objectives. Specific activities are shaped by the recognition that enhanced energy efficiency is a key to increasing industrial productivity and that improving efficiency of industrial energy use is closely linked to reducing waste and pollution. The goal of the industrial energy program is the creation of a more efficient, competitive, environmentally sound, and sustainable domestic industry, and to promote environmental stewardship, competitiveness, and job preservation and creation by demonstrating profitable alternative approaches to regulatory compliance.

The Department collaborates with industry to reduce energy use through new technologies in heat recovery, energy utilization, and industrial and municipal waste management. Other programs develop process improvements and innovations for specific energy-intensive industries such as pulp and paper, steel, and chemicals. In addition, applied research in combustion, biotechnology, advanced materials, and heat transfer will provide the foundation for future advances in technology. An active technology transfer program provides an effective link between the research and development programs and the community of potential users.

More than 50 technologies in the Department of Energy's Industrial Technologies Program are economically successful. An investment in developing these technologies of about $1.1 billion from fiscal year 1977 through 1994 has yielded approximately **$2.5 billion in energy savings and capital productivity.**

Catalytic Distillation
The advanced catalytic distillation process developed by the Department of Energy nearly 15 years ago has become a major commercial success. It is used to produce gasoline additives such as methyl-tertiary-butyl-ether and tertiary-amyl-methyl-ether, thus helping U.S. refiners produce the reformulated gasoline mandated by the Clean Air Act Amendments of 1990. As of fiscal year 1994, 80 units were on order at the manufacturer, Chemical Research and Licensing, Inc., 19 units were operating in the United States, and 40 units were operating worldwide--28% of the world market. **Advanced catalytic distillation saved 3.24 trillion British thermal units of energy in 1993 alone, at a rate of about $10 million per year.**

Ultralight Aerogels
Scientists sponsored by the Department of Energy at two national laboratories have developed a new material, called aerogel, that has the lowest density, highest porosity, lowest thermal conductivity, and lowest sound propagation of any solid ever made. **A 1-inch-thick layer of aerogel replaces 12 inches of fiberglass insulation.** This feature is particularly valuable in appliances such as refrigerators and water heaters. While industry interest in better insulation is being explored, the unique properties of aerogel have opened other market opportunities for this emerging technology. Because of their high surface-to-volume ratio, these materials can be used as catalytic and adsorbent surfaces and as carbon