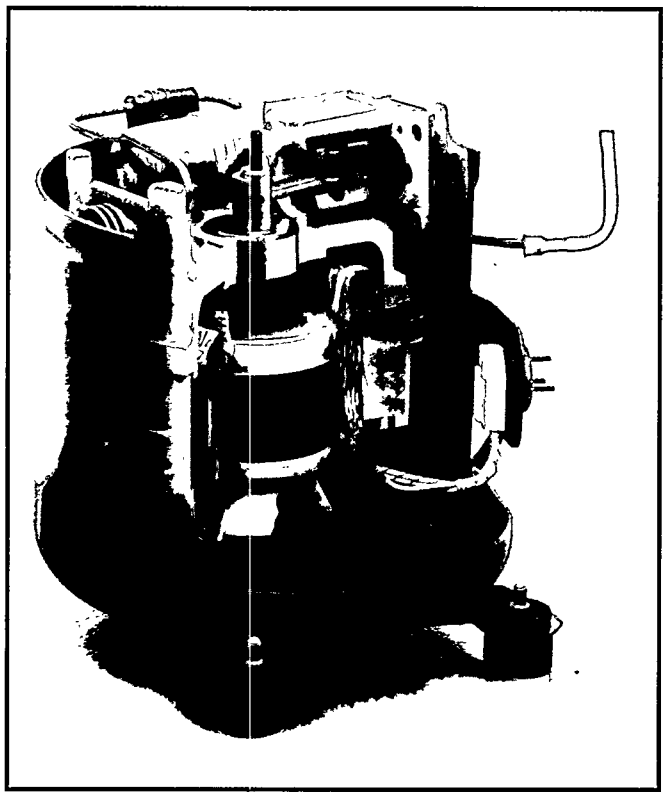
Buildings And Community Systems

High-Efficiency Refrigerator Compressor

Household refrigerators consume approximately 12 percent of the primary energy used in the residential sector. In an effort to reduce this consumption, DOE supported research by a major appliance manufacturer, the Kelvinator Company, to develop a more efficient refrigerator compressor. Through design changes in the refrigerator motor and suction muffler, Kelvinator achieved a 44 percent efficiency improvement over conventional refrigerator compressors. Kelvinator has manufactured over 30,000 refrigerators with this new high-efficiency compressor. Based on the success of the compressor design, Kelvinator recently introduced a more advanced compressor, the industry's first to be rated over 5 Btu per watt-hour. The design of the more advanced compressor is currently being offered to other refrigerator manufacturers. Full market penetration of high-efficiency compressors in household refrigerators would produce annual energy savings estimated at about 0.21 quads by the year 2010.



Cut-away view of the high-efficiency refrigerator compressor developed by DOE and the Kelvinator Company.

Solid-State Ballast for Fluorescent Lighting

Although the theoretical limit for a luminous light source is over 350 lumens per watt, standard fluorescent lamps operate at less than 70 lumens per watt. This inefficiency in standard lighting stimulated DOE to initiate a research program to improve the performance of fluorescent lamps. The program focused initially on the potential of solid-state ballasts to power fluorescent lamps at higher frequencies. Working with two small contractors, DOE developed and tested prototypes of solid-state ballasts that improved lighting efficacy by 25 percent. DOE-sponsored demonstrations of the benefits of solid-state ballasts in several office buildings convinced major lighting manufacturers to adopt this energy-saving technology in their product lines. Over 2 million solid-state ballasts are being used in U.S. buildings, saving 200 million kilowatt hours of electricity annually. Solid-state ballasts, currently installed in fewer than 3 percent of fluorescent fixtures in the United States, are expected to achieve a 50 percent market penetration by 1995.

District Heating and Cooling Development

Once prevalent in almost every metropolitan area in the Northern United States, district heating and cooling (DHC) systems have been almost completely replaced in today's cities by individual space conditioning systems operating on oil or natural gas. The energy conservation and fuel substitution benefits inherent in DHC systems prompted DOE to