

Ongoing Success Stories in the Buildings Sector

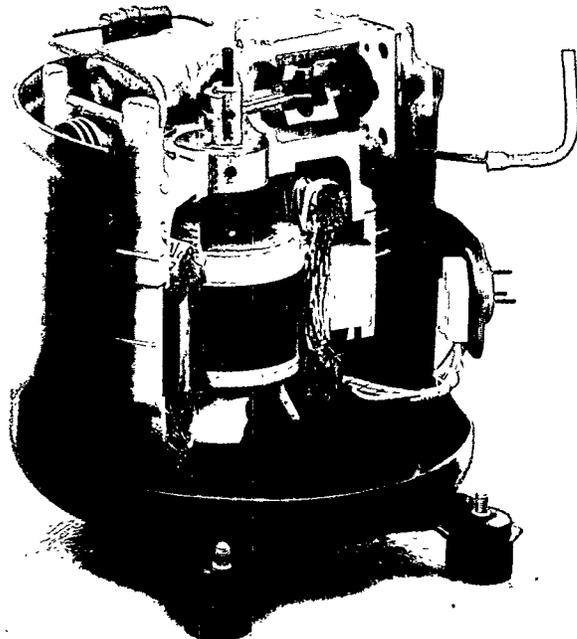
Commercial and residential buildings consumed 29.6 quads of energy in 1989, about 36% of the primary energy used in the United States. Moreover, energy consumption in the buildings sector is growing rapidly; by 2010, it may exceed 40 quads annually. A national effort to conserve energy in this sector during the next 20 years could save up to 30% of this total or 12 quads—worth almost \$74 billion per year (in 1988 dollars).

To help realize this enormous potential for energy savings, the Office of Conservation and Renewable Energy is supporting research on five key building systems: building envelopes, building equipment, indoor air quality, lighting, and design and construction systems. In addition, DOE encourages community energy management and supports research on the centralized production and distribution of heating and cooling systems.

High-Efficiency Refrigerator Compressor

Household refrigerators consume about 12% of the primary energy used in the residential sector. In an effort to reduce this consumption, DOE supported research by the Kelvinator Company to develop a more efficient refrigerator compressor. Through design changes in the refrigerator motor and suction muffler, Kelvinator achieved a 44% improvement in efficiency over conventional refrigerator compressors. Kelvinator now has manufactured more than 30,000 refrigerators with this high-efficiency compressor.

Based on the success of the compressor design, Kelvinator introduced a more advanced compressor, the industry's first to be rated at more than 5 Btus per watt-hour. Kelvinator's (now called Americold) compressors are the industry's most efficient and are currently being offered to other refrigerator manufacturers. Full market penetration of high-efficiency compressors in household refrigerators would produce energy savings estimated at about 0.21 quad per year by 2010.



This high-efficiency refrigerator compressor was developed by DOE and the Kelvinator Company.

Supermarket Refrigeration Systems

Supermarkets consume about 4% of the nation's electricity, much of which is used in refrigerated display cases. To reduce this energy consumption, DOE and a leading manufacturer of supermarket refrigeration equipment developed an innovative design, featuring multiple parallel compressors and advanced micro-processor controls, that reduces the energy consumed by more than 40%.

As a result of this DOE research, all leading manufacturers now offer advanced refrigeration systems with multiple, unequal, parallel compressors. Such systems accounted for 25% of the market for supermarket refrigeration equipment in 1987. Advanced supermarket refrigeration systems are expected to save between 0.25 and 0.37 quad of primary energy annually by 2000.