

low, and then attempt to keep costs below the bid. They are not motivated to voluntarily suggest the purchase of more expensive, nonconventional technologies. First costs are the critical factor; life-cycle costs are not.

To add to this problem, saving energy is a low priority in the supermarket industry. While energy is the second highest operating cost after labor, it constitutes only 3% of the total.

Another problem is that supermarkets run on low profit margins. The industry has a narrow margin for risk and little reward for experimentation. The required payback is between two and three years. Payback and reliability are both important, as are capital costs.

There is very little R&D in the supermarket refrigeration business. Product development tends to be gradual and incremental, due to:

- the reticence of supermarkets to take risks in the purchase of equipment;
- the significant retooling costs of a major change in manufacturing; and
- the difficulty of retraining service personnel.

Residential air conditioning dominates commercial refrigeration (including supermarket systems) both in terms of sales and R&D effort.

The Food Marketing Institute is the main source of R&D funding for the industry. Most of its R&D, however, is directed at boosting labor productivity. Only a small fraction of the Institute's R&D funds is directed towards grocery store energy use. The Electric Power Research Institute (EPRI) also has a refrigeration R&D effort and it is much larger than the refrigeration research programs of FMI or DOE.

Patents are not highly valued in this industry because competitors rapidly design around them. But a headstart in the market place is valued. Nevertheless, concern over disclosure of competitive information did not present a problem in this case study.