

participation of building occupants or tenants. These "imposed choices" limit or eliminate the ultimate consumer's role in decision making (Quelch, 1980). Because builders are sensitive primarily to first costs, the exclusion of the owner/occupant from decision making results in less energy-efficient choices and higher life-cycle costs.

Even when builders are willing to install energy-efficient equipment, there is usually no mechanism that allows them to recover the higher initial investment. Much commercial space, for example, is leased under agreements that do not allow pass-through of investment costs or savings from energy-efficient equipment replacement or building modifications. Similarly, master metering of apartment buildings and other multi-occupancy structures leads to misplaced incentives in much of the U.S. building stock.

Although some owner/occupants might choose more efficient buildings and equipment if the choice were in their hands, many are unaware of the energy characteristics of common appliances and building components. Owner/occupants also may have high discount rates or prefer to invest capital in options other than improved energy efficiency. Uncertainties associated with the cost of energy, as indicated by the wide fluctuations in energy prices over the last two decades, reduce end-user interest in energy-efficient technologies as well.

The lack of adequately trained service and maintenance personnel to support new products is often another important barrier to their adoption. This barrier was significant in two of our case studies: the heat pump water heater and the microprocessor-controlled compressor train for supermarket refrigeration (Section 4.3).

The entry of new firms can be delayed and sometimes denied by market practices such as high advertising costs, predatory pricing, and long-term