

as exploratory R&D projects, but the initial phases of contracted research were product-oriented and not of a basic nature (e.g., solid-state ballasts, low-E windows, and the heat pump water heater).

As a technology matures and the R&D moves toward an applied phase, the technical risks are typically reduced by demonstrating the feasibility of the innovation or by learning through doing. However, because the technology has not been completely adapted to industrial applications, a large element of uncertainty remains in the area of advanced engineering development. At the same time, the market potential should begin to clarify. If the technological and market opportunities appear large enough and the potential returns appear to be promising, individual companies would become more willing to make a strong commitment to further develop the technology. At this stage, working with industrial partners is a more appropriate strategy. Also useful is influencing key decision-makers and trade and professional organizations.

Generating end-user demand is generally inappropriate during exploratory research because at this stage the message for end-users is usually unclear. In our case studies, the supermarket refrigeration system and the flame retention head oil burner were both effectively transferred through end-user outreach, and they were relatively mature technologies when the information programs began.

6.2.2 Nature of the Technology: Product vs Process

According to Kamien and Schwartz (1982), "Process innovations are technical advances that reduce the cost of producing existing products, whereas product innovations involve development of newer improved products."¹ OBCS innovations that are "process" oriented include the Hotbox