about 1.3% for every 1% increase in price. Perhaps this is because industries and commercial transportation companies which are in pursuit of profits are quicker to adopt more efficient technologies or to change production or management practices. They may also have at their disposal a monitoring system allowing them to determine consumption and hence the conservation investment required to offset increased fuel prices.

Once again it must be emphasized that the estimates of the reaction of the commercial consumer to price are limited to a certain range of prices and quantities during the past decade. Furthermore, the sensitivity to price is likely to increase for some energy applications over the very long run. In the short run, price increases may have a small impact if individuals cannot substitute more efficient technologies.

6. DELAYS IN ADOPTING ALTERNATIVES

A number of energy alternatives and conservation measures appear to be economically viable today. It takes time, however, for a given technology to be put into place, for a new design to become widely accepted or for a practice to become widely adopted. There are basic economic reasons for this. Some are obvious; others are more difficult to explain.

Take the example of a house with an old oil furnace. More efficient heating systems are now on the market, including more efficient oil furnaces themselves. Why then do many homes continue to be heated with old furnaces in the face of higher heating costs? Such relatively expensive items tend to stay in service long after their replacement seems advisable. The reasons for this relate to the economics of fixed assets.

- Markets for such assets may be imperfect. Information may be inadequate and an individual may not know about cheaper alternatives.
- Decision-makers may not correctly assess the benefits of replacing an old inefficient system because the costs and benefits which accrue over time are ignored.
- The old system may continue to deliver service worth more than its salvage or trade-in value, while the normal requirements of the system do not warrant the capital outlay for a new system.

The first two points can be addressed by appropriate policies. The last point is an economic fact of life which is characteristic of all fixed assets, the effects of which can nevertheless be overcome by appropriate incentive programs. Conversion grants, for example, have the effect of decreasing the cost of the services offered by a new system. Two examples of such grants offered by the Federal Government are: (1) grants to assist homeowners and businesses for conversion from oil to gas, electricity, renewable and other energy sources, up to 50% of conversion costs to a maximum of $800; and (2) grants to commercial fleet owners of up to $400 per vehicle to convert to propane.

To further illustrate the impact of the above constraints, let us once again look at the example of replacing an outdated heating system. Canadians change residences frequently and many of us are tenants. We are therefore reluctant to make investments in insulation and more efficient heating systems because our costs may not be fully recovered. If the third constraint applies, then both owner and tenant are acting rationally. The owner may not, though, have full knowledge of heating system alternatives or may not be correctly assessing the benefits of a new system. In this regard, the dissemination of information about alternatives and about methods for correctly assessing costs and benefits over time through the application of "life cycle" costing analyses will be effective in overcoming delays in the adoption of alternative technologies.

Life Cycle Cost Analysis

Life cycle cost is the total of all relevant costs associated with an activity or project during the time it is analyzed, including all costs of ownership, operation and maintenance. The *life cycle* is the period of time between the starting point and cutoff date of analysis over which the costs and benefits of a certain alternative are incurred. If life cycle benefits exceed life cycle costs, then the project is economically desirable.

In any event, delays must be anticipated and taken into account when analyzing the probable impact of energy-related policies. Failure to do so may lead to frustration with the pace of adoption of new technologies and energy conservation measures, and hence unwarranted condemnation of good policies. Firm action and consistent policies will help assure rapid progress in the adoption of conservation practices and new energy-efficient technologies.