

ECONOMIC EVALUATION OF INVESTMENT IN ELECTRICITY CONSERVATION

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Energy efficiency and the achievement of energy savings rank amongst the most important issues in today's developed countries. For many years, with the rise in living standards and the development of industry, the demand for energy has been increasing. This increase in energy demand has negative external effects that should be considered in government policy for promoting economic development. A growing understanding of the importance of this issue has given rise to different types of government policy measures focused on investment in energy conservation.

According to non official estimates of the Ministry of Infrastructure in Israel, potential energy savings in Israel could reach 20%-30% of total energy consumption. Energy expenditure in Israel is estimated at about \$1.7 billion, so annual energy savings could reach about \$425 millions. While the benefits of such programs appear to be promising, costs should be taken into account as well. Costs include payments to consumers as an incentive to scrap old appliances, as well as administrative costs and the costs associated with financing the early purchase of new appliances (to replace the scrapped appliances). It is important, therefore, to consider both costs and benefits when dealing with such programs and this will be the aim of the current paper.

The market forces that encourage efficient energy use at the firm level in the industry sector, fail in the household sector. Households lack adequate information regarding energy efficiency and are reluctant to replace old electrical appliances; even if the replacement is economical in the long run (they lack the capability for performing economic analyses and have high switching costs). Both types of agents (firms and households) take into account only the direct costs and benefits of their decisions and ignore the external costs. In order to contend with these market failures, government intervention is needed.

Another issue that needs to be taken into account is the issue of increased consumption during peak hours. In recent years, shortage of electricity reserves in Israel to meet demand during hours of peak consumption has resulted in the building of new power stations, which increase external costs even when not utilized. Consumption in peak demand hours also necessitates the utilization of the marginal unit of electricity generation – which is generally the least efficient and most expensive. Energy conservation can help delay the necessity of constructing and utilizing these plants, especially if conservation is achieved during peak hours

The paper presents an economic study of the potential for energy conservation in Israel, focusing on the economic feasibility of scrapping old household electrical appliances, and considering the effect of such policies at both the household and the macro-economic level. The results of our analysis show that the appliance that provides the most conservation is the air conditioner (used for both heating and cooling). A scrapping program for old air conditioners passes a Cost Benefit Analysis (CBA) even when external benefits are excluded from the calculation. When external benefits are included, scrapping programs for both washing machines and dishwashers pass the test as well. According to our findings, the annual economic benefit of a program involving the scrapping of 100,000 air conditioners,

45,000 washing machines and 15,000 dishwashers per annum over ten years ranges from 246 million New Israeli Shekels (NIS) in the first year of implementation to 693 million in the tenth year. Most of the savings are derived from the scrapping of air conditioners.