ECONOMICS OF ENERGY CONSERVATION: THE CASE OF ADOPTION OF COMPACT FLUORESCENT LAMPS IN HOUSEHOLD SECTOR IN SRI LANKA

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Abstract

At present, power crisis is one of the major problems in Sri Lanka. The critical dependence of modern economy on energy in various forms underlines the need for effective development and use of scarce energy resources. Sri Lanka's electricity requirement has been growing at an average rate of 7%- 8% annually. Nearly 70% of the annual demand is met by hydropower plants. But, due to high demand new thermal plants have added to national grid. This will badly affect on environment. The primary solution to this problem is reduce the need for energy by conservation measures.

In Sri Lanka out of total electricity consumption a considerable amount of energy is consumed by the household sector. About 70% of household electricity consumption is for lighting. Hence, the household lighting sector represents a significant opportunity for energy conservation due to the almost exclusive use of inefficient incandescent sources.

Energy efficiency is a vital component of nation's energy management strategies. A large number of energy efficiency technologies are reported to be cost effective at current appliance and electricity prices. One of the energy efficient lamps is Compact Fluorescent Lamps, which consume only about one fifth of power for the same light output compared with traditional incandescent light. However, such energy efficiency technologies are not widely used because of various impediments of their adoption.

The main objectives of this study are assessing the financial and economic feasibility of replacement of incandescent bulbs with CFLs and determine factors affecting the adoption of CFLs.

To achieve these objectives Simple Payback Period, Cost Benefit Analyses, and Tobit Model carried out using primary and secondary data.

Based on year 2002 tariff structure simple payback period is less than five years at all the tariff categories. This implied that replacement of CFLs is significantly profitable at every household regardless of the electricity consumption level. As well net savings from consumer point of view is much higher in every tariff category.

Financial and economic feasibility of this project is estimated through the financial, economics and extended cost benefit analysis. All these analyses indicate that replacement of inefficient lighting with CFLs is cost effectiveness from financial, economic and environmentally sound manner.

This study tested the statistical validity of various hypotheses on consumer level barriers to the adoption of CFLs in the household sector using primary data collected from Kandy Municipal area. Tobit analysis was carried out considering total expenditure on spend on Compact Fluorescents Lamps as a dependent variable with eight independent variables. I.e, monthly family income, size of the house, family size, ownership of the house, decision maker's age, education level, attitudes towards the adoption of conservation methods and technical knowledge of the decision maker were considered as independent variables. The results of this model indicate that all the independent variables are significantly affect the conservation expenditure. All the independent variables are positively related with adoption of CFLs except decision maker's age as hypothesized. The non-adoption of conservation methods are influenced by low-income, inadequate awareness, lack of information, risk and uncertainly associated with its use.

The low education level lack of technical knowledge and negative attitudes towards the adoption of conservation methods are additional hindrance in the adoption of CFLs.

Cost benefit analyses reveal the financial and economic feasibility of replacing inefficient incandescent bulbs with CFLs. Hence, demand side management plays important role to prevent the power crisis. But, high initial cost of adoption of efficient lighting technologies badly affected this solution. So, it can be recommended that an incentive scheme with a higher level of subsidy be provided to consumers. Also increasing the pubic awareness of energy efficient technologies can be recommended. Importance of extension education as a means of changing attitudes towards the adoption of EETs and technological knowledge is also emphasized to strengthen the adoption of energy conservation method.