

## Abstract

The lack of proper consideration for energy-saving criteria during the current design practice of detached houses, especially in several housing projects has led to the accumulated heat and discomfort for occupants. The common use of air conditioning offers only short-term solutions but not the efficiency in energy consumption. Thus this research aims propose the guideline for improving the energy efficiency of detached houses in residential housing projects with the appropriate amount of renovation cost.

Reviews of the relevant literatures and existing researches were conducted for the study. There were also surveys of the physical conditions of the subjected dwellings in the housing projects in Bangkok metropolitan area as well as the behavioral pattern of energy consumption and the break-event period for improving energy consumption. Questionnaire was used for primary data collection from 174 residences in the Parichart housing project in Klong 4, Rangsit area in order to determine the relationship between the concerning factors. The calculations for the reduction in energy consumption after various alternatives were performed on DOE software for comparison.

The guidelines for improving energy efficiency of detached houses were summarized into 3 alternatives:

1. The use of fiberglass insulation, 3 inches thick, paved over ceiling which involves the least budget and can save energy for 19 percent per year; the break-even period is about 2.75 years.
2. The use of insulation of fiberglass, 3 inches thick, paved over ceiling and the replacement of green tinted glass which can save energy for 36 percent per year. The break-even period is about 3.41 years.
3. The use of exterior insulation and finish system (EIFS), using 2-inch thick foam, on the southern side and western side and the replacement of green tinted glass, together with the use of fiberglass, 3 inches thick, paving on ceiling which involves the largest budget for reducing electricity cost by 51 percent per year with the break-even period of 7 years.

However, it should be noted that the figures in this study was based on the cost in the year 2005. Appropriate revision on the cost of energy and construction materials must be performed before any implementation in the future.