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## Understanding Resident's Perception of Energy Saving Habits in Households in Bangkok

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### Abstract

The Thailand twenty-year energy efficiency development plan in 2015 aimed at decreasing energy consumption in the building sector about ten percent by 2030. One of the strategies is to promote residents upgrading high efficient home appliances and changing their behavior. This paper investigates the existing residents' behavior and their interest in behavior change for reducing home energy consumption. The survey was conducted from four hundred households in Bangkok neighborhood areas. The questionnaires includes four parts covering: i) personal information, ii) an understand of energy saving strategies and way to receive information from the saving campaigns, iii) a number of home appliances and its usage schedule, and iv) energy-saving habits and behavioral changes in the future. Women are more likely energy-saving habits than men. Most residents presently selected efficient air conditioners and home appliances with energy rating labels and a few did change their behavior. Potentially saving more energy, they were interested in changing their behaviors on low-cost activities and minor retrofits of building structure. Understanding such household energy conservation behaviors could significantly contribute to effective energy policy making which suits the resident's need and encourages home energy savings.

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## 1. Introduction

Energy consumption in Thailand's building sector shares twenty-two percent of national energy consumption, which ranks the third after the transportation and industry sectors. Population in Bangkok metropolitan area has been growing quickly. Regarding urbanization, the population growth rate in suburban area grew sixty-six percent or twice of the year 2000 [1]. According to the United Nations report, there were 14.5 million residents in 2013 [2]. The increase of residential units significantly affects the energy consumption in Thailand. Concerning this issue, the government of Thailand plans to decrease the energy consumption in the commercial and residential buildings about ten percent by 2030 [3]. To achieve the target, several strategies and guidelines for building energy conservation such as high energy efficient appliances and behavior change were promoted via media and publications. However, some campaigns are not successfully implemented since they do not match with the resident's interests. Consequently, understanding the resident's needs on their energy saving activities and preferable behavior changes could benefit for the government to determine strategies and guidelines for households' energy savings. This study aims at investigation of the resident's perceptions of home energy conservation including their saving habits and preferable behavior changes.

## 2. Methodology

The surveys were conducted from a random of four hundred households in Pathumthani, Nakornnayok, Samutprakarn, and Nontaburi provinces. The questionnaire includes four topics covering: 1) personal information, 2) energy-saving habits and behavioral changes in the future, 3) a number of home appliances and its usage pattern, and 4) perception of the energy conservation plan and the government's campaigns. For investigation of resident's perceptions of their energy saving habits and behavior changes, the resident was asked to select saving activities that they have done and rank behavior change in the future in order of their interest numbering 1 to 5 as an interval scale. The list of questions in each topic is presented in Table 1.

Table 1. A list of topics and questions used in the questionnaire

Topics	Type of questions
Personal information	<ul style="list-style-type: none"> <li>- Gender</li> <li>- Age</li> <li>- Income</li> <li>- Number of members living in house</li> <li>- Respondent's role in the family</li> </ul>
Existing saving habits and interest in home energy conservation	<ul style="list-style-type: none"> <li>- Resident's habits on energy savings</li> <li>- Potential changing behavior contributing more home energy savings</li> <li>- Existing home retrofit for energy saving</li> <li>- Potential home retrofit contributing more home energy saving</li> </ul>
Number of home appliances and usage patterns	<ul style="list-style-type: none"> <li>- Number of home appliances and their usage patterns</li> <li>- Number of air conditioners and usage patterns</li> </ul>
Perception of Thailand energy conservation plan and the government's campaigns	<ul style="list-style-type: none"> <li>- Understanding and knowledge about energy efficiency plan</li> <li>- Limitations of energy saving in households</li> <li>- Reason to by home appliance</li> <li>- Acceptable payback period</li> <li>- The way to receive energy saving campaign</li> </ul>

## 3. Results

The data collection was derived from a survey of 181 men and 219 women, who owns a detached house located in Bangkok neighborhood areas. It was found that the residents were interested in home energy saving. However, they concerned those saving activities would increase incremental cost. In addition, they needed more useful information for decision-making, especially the most effective energy efficient saving activities and its payback period. Regarding resident's saving activities, women are more likely saving habits than men. Durability is the first priority that the residents decided to buy home appliances, then energy efficiency and product's price, respectively. After upgrading high energy efficient home appliances, the residents expect a payback period ranging from 2-4 years. Besides personal information, the residents were asked for the number of air conditioners and home appliances in their home. The average number of home appliances and air conditioners obtained from the survey is presented in Table 3.

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