Support Tool for Ranking Energy-Saving Activities Considering Residents Preferences

Background

In Japan, energy demand in the residential sector is increasing. There are several methods of reducing the energy demand by household members, but energy-saving effects enabled and benefits lost by energy saving differ significantly among individual activities.

To promote effective energy saving, it is important to consider the people's preference and characteristic of the each activity.

Objectives

The purpose of this study is to develop the support tool for ranking energy-saving activities in residential houses that shows selection-priority of the energy-saving activities based on input about people's preference and user's information such as the number of people in the household.

Principal Results

1. Development of the support tool for ranking energy-saving activities

We categorized various energy-saving activities carried out in houses, and quantified their advantages and disadvantages. Moreover, we created a model that helps residents select the energy-saving activities appropriate for their lifestyle through an analytic hierarchy process [1] (Fig. 1). This model calculates the selection-priority of the energy-saving activities considering not only quantitative factors such as amount of the energy saved and cost saved, but also qualitative factors such as convenience and comfort of users.

2. Application of the tool on the web-base program

Based on the model, we developed "Piece Eco [2]", which is a web-base tool that can be easily used on personal computers (Fig. 2). The tool selects 10 energy-saving activities appropriate for each user's preference and information among 137 activities, and shows the expected amount of the energy saved and CO_2 reduction.

Activities selected in many cases seem to contribute to energy-saving and CO_2 reduction and can be accepted widely.

Future Developments

Contribute to effective energy-saving in the residential sector in Japan.

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Reference

T. Ueno, et al, 2006, "An approach to reduce the standby power in residential buildings using analytic hierarchy process", CRIEPI Report R05010 (in Japanese)

T. Ueno, et al, 2007, "An approach for ranking energy-saving activities in residential buildings -characteristics of the model-", CRIEPI Report R06006 (in Japanese)

T. Ueno, et al, 2008, "Development of a support tool for ranking energy-saving activities considering residents preferences", CRIEPI Report R07009 (in Japanese)

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[1]：Analytic Hierarchy Process (AHP): The methods for decision making process. It can be applied to solving the problem having qualitative elements such as a decision- maker's judgements. it is a systematic method for comparing a list of targets, criteria.
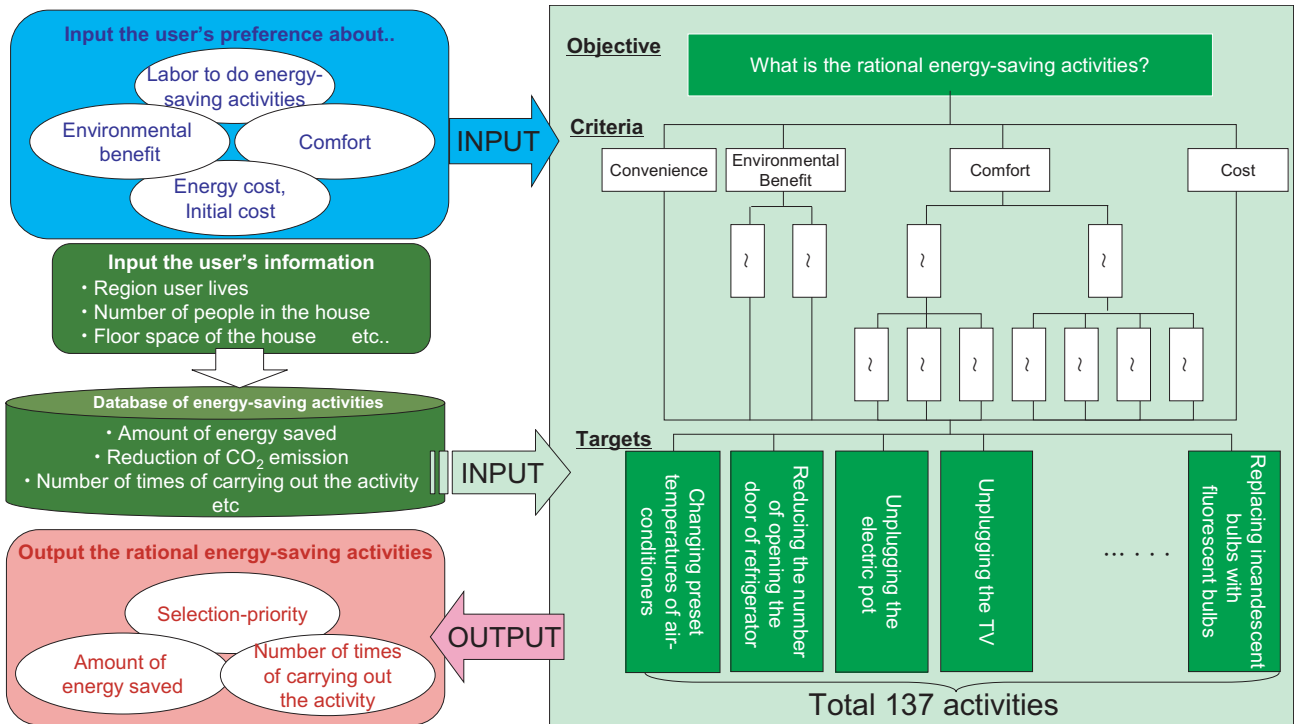
[2]：PieceEco can be used in the website of CRIEPI (http://criepi.denken.or.jp/pieceeco)

Fig.1 Outline of the support tool for ranking energy-saving activities

Fig.2 Example of display picture on the tool (in Japanese)