

Changes of Energy Saving Behavior Since the Earthquake in Japan

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Introduction

We analyzed the structure of energy savings based on wide scale questionnaire surveys with around 5,000 sample sizes since the Great East Japan Earthquake 2011 in Japan. People in Japan have been focusing on how to effectively conserve energy, especially electricity. This is the innovative approach for understanding the changes of human behavior for energy consumption because any verification tests have never attempted in such a wide and long scale even in the world.

This poster addresses the issue if energy saving behavior on residential sector could be achieved or not. We found that 7-10% electricity saving with correlating energy usage with air temperature in Kanto area around Tokyo was achieved on summer and winter in 2011 from questionnaire surveys. In addition, even in one year after the earthquake, that is, summer in 2012, survey result clarifies that people could save a little more electricity compared to the level of 2011. Why could people achieve? Which actions could they take? Beside such simple questions, it is not still obvious, which actions contributed to electricity demand reduction, as well as which actions would be continuous in the future. Quantifying the contribution ratio of each action to the energy saving amount is also our target to be clarified.

Analysis Approach

This research aims to get a solution by applying multivariable analysis to the result of web-based questionnaire surveys. We conducted 3 times surveys to find out what happened to people concerning energy saving behavior since the earthquake, and developed multi regression model explaining the reduction of electricity demand in 2011 and 2012 compared to the previous years as an objective variable. In order to collect the electricity usage of each sample as an objective variable, we obtained the billing receipt from 2010 to 2012. In addition we investigated the implementation of energy saving actions such as changes of setting temperature and usage hours of air conditioner (AC), disposal/purchase/replacement of appliances, and the degree of any other energy saving actions.

Results

As the most effective actions, the replacement of appliances which consume large electricity amount was dominant because efficiencies of such appliances have been improved drastically. The implementation ratios of replacement behaviors, however, are low because people usually don't purchase a new appliance unless it would break down. Even if these replacement actions are effective for energy saving, it cannot be seen as recommendable actions for everyone. In contrast, as easier actions to implement, small actions such as reducing usage hour for AC, electric heaters, and heating appliances like rice cooker, closing doors when ACs are working, and setting the temperature of refrigerator low, are extracted as easier actions to be taken. Due to the consideration under both of the effect and the implemental rate of electricity saving actions, we clarified the replacement of LED, which occupied around 10% contribution ratio to the total energy saving volume, and the reduction of used hours of AC or heaters, which occupied around 30% contribution ratio, are effective and continuous most.