

# ENERGY USE BEHAVIOR: THE EFFECT ON ENERGY CONSUMPTION

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## Abstract

Energy, is an indispensable source of human life not only in the industrial sector, but also in agriculture, transport and housing sectors. People need energy even to meet their daily needs: cooking, heating and cooling of houses, communication and communication activities require a certain amount of energy to be consumed. Technological developments, increasing population and production rate are important factors that increase energy consumption in countries. In this study, the effect of energy use behavior on energy consumption was investigated.

## 1. Introduction

Energy, as an indispensable source of human life, is one of the topics discussed in the world agenda today. In order to carry out the developing industrial activities, the production and use of the machines is needed for the energy of the human power. The need for large quantities of raw material to be processed by these machines is as important as energy. Energy is an indispensable resource not only in the industrial sector, but also in agriculture, transport and housing sectors. The basis for the sustainability of industrial activities is based on the supply of raw materials as well as energy. Regardless of the level of development, the need for energy of people has become an indispensable necessity, and the energy consumption area is not limited to industrial activities. People need energy even to meet their daily needs: cooking, heating and cooling of houses, communication and communication activities require a certain amount of energy to be consumed. As energy consumption increases, people can be thought to have increased levels of welfare [1].

Energy consumption, housing has an important share in energy use in houses and energy use behavior is very important, but energy use behavior is very complex and is rarely used in traditional economic theories [2]. Energy consumption in residential buildings has an important share in sustainability management [3]. Appliances used in Residences for heating, cooling, cooking, and energy-consuming purposes are the major components of final national energy consumption.

Domestic energy use has a significant share in total energy consumption in housing in OECD countries and non-OECD countries. For example, in 2013, 21.7% of total energy consumption in the United States and 37.7% of total electricity consumption [4]. One of the important issues related to energy consumption is climate change [5].

The effects of energy use in residential buildings are: climate, building envelope, residential Energy Systems, thermal comfort, housing management and maintenance and energy usage behavior [6]. In this study, the effect of energy use behavior on energy consumption was investigated.

## **2. Relationship Between Energy Consumption And Housing**

Energy consumed in houses, environmental factors, climate, housing properties and user behavior are affected by parameters such as. The effect of user behavior on energy consumption is evident [7].

Reducing energy bills, reducing external dependence on energy and leaving a livable environment for future generations, requires efficient use of energy. Small changes in energy use habits can result in significant gains, along with measures to be taken in housing. In other words, the energy of an object is the sum of its kinetic energy and potential energy. In Turkey, which imports 62% of total energy needs, efficient use of energy has become very important [8 ].

## **3. Energy Use Behavior And Savings In Residential Buildings**

User behavior is influenced by many reasons, external, internal or individual and housing. The interaction of the user with the building control systems is an aspect of human behavior. Human behavior is the result of a continuous combination of many factors of discipline ranging from social sciences to science. In the classification of human behavior as a result of physical and psychological needs, physical needs are connected to the individual and are associated with lighting, climate conditions and sound levels. Psychological needs are the result of personalization and interaction. In this context, the user behavior can be defined as the behaviors that the people in the house do or do not do in order to influence the interior environment, and the use of the installation systems and other equipment in the house that may affect energy consumption can be defined as user behavior [7].

The share of electricity consumption in residential households; refrigerator 30.38 %, lighting 28.65%, ovens 10.42% television 9.77%, washing machine 6.51 %, dishwasher 5.64 %, iron 4.34 %, sweeper 2.39% and hair dryer 1.91% .

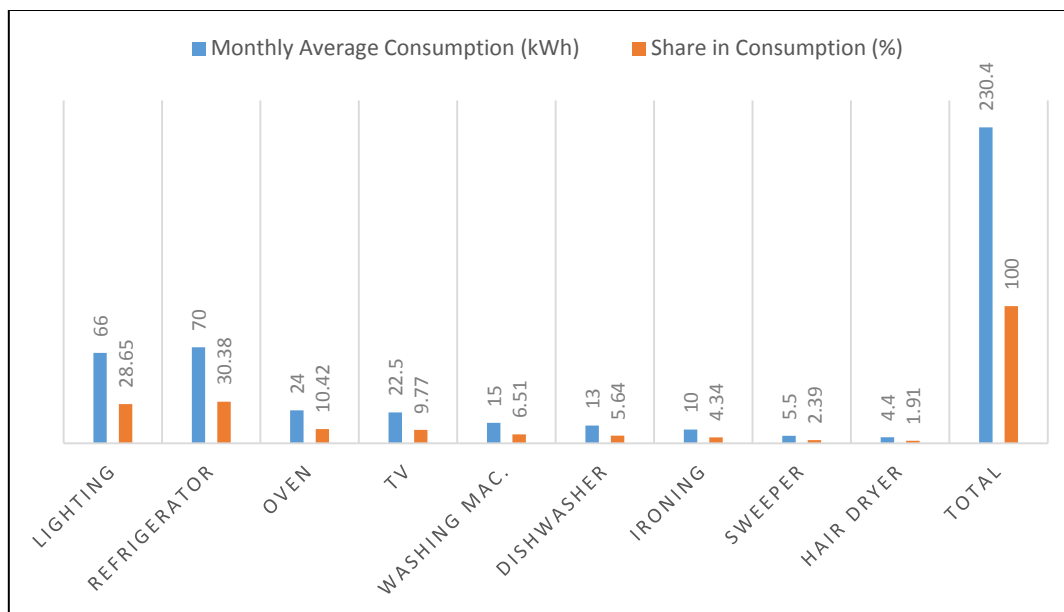


Figure 1 : The share of electricity consumption in residential households [9]

In order to reduce energy consumption in refrigerators, the refrigerator suitable for the need should be selected and should not be near the heat-emitting regions. It is possible to consume 80% less energy by using energy saving lamps in lighting. In furnaces, energy loss can be reduced by temperature control. It is possible to save 10% by not leaving devices such as television and CD player in stand by position. It is possible to save about 52 %, with steam-powered irons and 10% with suction-powered vacuum cleaner selection by selecting a suitable and energy-efficient washing machine [9].

#### 4. Conclusions

In this study, the effect of energy use behavior on energy consumption was investigated. Technology developments, increasing population and production rate are important factors that increase energy consumption in countries. The world's energy reserves are limited and significantly reduced, leading to new searches for energy. The efficient use of energy in houses depends on the personal habits and behaviours in the use of energy, along with housing design. Small changes in energy use behavior will significantly reduce energy consumption as well as export-dependent costs in energy sources.

#### References

- [1] İ. Akova, "Enerji kullanımındaki değişimler" Nobel Yayıncılık, Ankara, 2016.
- [2] E.R Frederiks, K. Stenner, E.V. Hobman, " Household energy use: Applying behavioural economics to understand consumer decision-making and behaviour", Renewable and Sustainable Energy Reviews, vol 41, pp, 1385-1394, 2015,

- [3] N. Camara, D.Xu, E. Binyet, “ Enhancing household energy consumption : How should be done? Renewable and Sustainable Energy Reviews, vol 81, pp, 669-681, 2018.
- [4] S. Jia Wang, P. Moriarty, “Strategies for household energy conservation” Energy Procedia, vol 105, pp 2996-3002, 2017.
- [5] E. Delzende, S. Wu, A. Lee, Y. Zhou “The impact of occupants’ behaviours on building energy analysis : a research review” Renewable and Sustainable Energy Reviews, vol 80, pp, 1061- 1071, 2017.
- [6] B. F.Balvadi, E. Ghisi, R. Lamberts, “ A review of occupant behaviour in residential buildings”, Energy& buildings in press
- [7] E.E. Karahan, “Konut kullanıcı davranışı ve Enerji Tüketimi: Literatür değerlendirmesi”, İstanbul Ticaret Üniversitesi Fen Bilimleri Dergisi, Sayı 26, s 73-90, 2014.
- [8] F. B. Karel, Y. Yavuz, E.E. Gerek, F. Karaer, S. Malkoç, “ Enerji Tasarrufu” Anadolu Üniversitesi Açıköğretim Fakültesi Yayını No: 2113, Edit: Y.Yavuz, Eskişehir, 2016.
- [9] <http://www.emo.org.tr/genel/sss.php?grubu=ENERJ%DD%20VER%DDML%DDL%DD%D0%DD#5>

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