

## ENERGY END USER BEHAVIOUR. RESEARCH GROUPS

## ENERĢIJAS GALALĪETOTĀJU UZVEDĪBA. IZPĒTES GRUPAS

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**Keywords:** *Electrical energy, energy consumption, energy efficiency, assessment of energy savings, reviews, questionnaire, household, modeling, smart meters*

### Introduction

In accordance with the EU total energy consumption reduction targets, increasing emphasis is being placed on involving every consumer in implementing energy efficiency measures. One possibility is to reduce energy consumption through smart technologies. In this context, the European Union has set an ambitious target for 2020: to equip 80% of households with smart meters<sup>1</sup>.

Currently there is no national strategy for smart technology, nor legislation, nor any vision for the future are not reflected. The only piece of legislation that sets targets for energy end-use efficiency is the Energy End-Use Efficiency Act<sup>2</sup>. Significant energy end-user involvement in energy efficiency measures can not be achieved using existing analog meters. Smart electricity meters present broader possibilities.

This paper presents first research steps to investigate factors influencing energy end-user behaviour.

The use of various types of information to encourage consumers to reduce energy consumption is an essential prerequisite for the use of sustainable energy. Such consumer management is a significant component of the smart grid concept. Information on intelligent systems and technologies plays an important role in enhancing the public's awareness of environmental and energy issues that will affect their future behavior. The quality of the information and the energy efficiency targets set play an important and vital role.

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<sup>1</sup> Eiropas Parlamenta un Padomes 2009. gada 13. jūlija Direktīva 2009/72/EK par kopīgiem noteikumiem attiecībā uz elektroenerģijas iekšējo tirgu // Eiropas Savienības Oficiālais Vēstnesis, 5 L 211/5, 14.08.2009.

<sup>2</sup> 28.01.2010. likums "Enerģijas galapatēriņa efektivitātes likums" // VSIA "Latvijas Vēstnesis"// LV, 27 (4219), 17.02.2010.

A recent study conducted by Vassileva I, et al. (2012), analysed the results of questionnaires administered to 2000 Swedish households to gain an understanding of the public's awareness of energy consumption. It was found that consumers are motivated to save energy if it is possible to reduce the cost of energy (for example, Ls / kWh) while not reducing consumption expressed in units of energy (for example in kWh). However, if electricity bills make up a small part of family income and / or other household expenses, then information on the feasibility of reducing the cost of energy does not give the desired results<sup>3</sup>.

The authors of the study also believe that a pretty big incentive to reduce energy consumption will be if people are given information on the typical (average) power consumption of the consumer group, they are given the opportunity to compare energy consumption among different households in the consumer group and consumers have the opportunity to share their recommendations and expectations. It is clear that information has a major impact on people's behavior. Correct and accurate information on energy consumption reduction issues promotes citizen participation in energy efficiency measures.

### **Research idea under the project**

The idea is to conduct research and analysis on the impact of information on the behavior of electricity customers and on the reduction of energy consumption. For the "target group" of the research (500 households) existing analog meters will be replaced with smart electricity meters, a data reading system will be implemented and the opportunity for electricity customers to receive information on their power consumption in order to achieve a power consumption reduction of 10% will be provided. Target groups will be divided up into 4 groups according to their electricity consumption per month: 200-400kWh, 400-1000kWh, 1000-2000kWh, 2000-4000kWh. Along with the target group there will also be a control group of 500 households which will not receive smart electricity meters. This group will serve as a "reference" group for the comparison of data before and after the project.

The types of information and communication used are crucial for projects related to the introduction of smart technologies. The information objectives of this project are to: 1) provide the households included in the project with information on actual electricity consumption and carbon dioxide emissions; 2) promote the active participation of households in energy efficiency and conservation measures; and 3) explore possibilities for promoting energy efficiency in households using smart technology opportunities.

### **Methodology of research**

The methodology of the research is based on an analysis of the impact of information on the behavior of electricity customers and on reducing energy consumption.

4 research groups will be set up in the course of this study:

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<sup>3</sup> Vassileva I., Wallin F., Dahlquist E. Understanding energy consumption behavior for future demand response strategy development // Paper submitted to journal "Energy", Accepted 25 February 2012, the Paper is in progress „Article in press”

- Group 1: half of the target group (250 household) with smart metering, have been provided with the usual information package and additional information;
- Group 2: half of the target group (250 households) with smart metering, have been provided with the usual information package and without additional information;
- Group 3: half of the control group (250 households) without smart metering, have been provided with the usual information package and additional information;
- Group 4: half of the control group (250 households) without smart metering, have been provided with the usual information package and without additional information.

The aim of the research is to understand differences and key factors influencing power user behavior and their motivation to reduce consumption, depending on the volume and frequency of the information provided.

Assessing the impact of such information will involve the following steps:

1. Preparing and presenting information for the target group and control group households with or without the collaboration of "Latvenergo". IESE researchers will compile further information on power consumption and efficient use and will provide advice on how to reduce energy consumption, information on the better electricity services, having regard to the latest technological advances, and advise "Latvenergo" on possibly more rigorous and interesting information providing on energy consumption more efficiently than in previous months / years.
2. Preparing and distributing information on energy consumption and energy efficiency, using a variety of information resources: information sheets, brochures, informative seminars, different informational videos and web pages and using interesting information resources which are as varied as possible (games, colouring books for children, etc.).
3. Performing data analysis on the impact of information on user behavior, i.e. researching the relationship and a correlation between power consumption and the amount of information provided to each of the 4 research groups.

***Laicane I., Blumberga A., Timma L., Romagnoli F., Blumberga D., Energy end users behaviour. Research groups.***

*The idea is to conduct research and analysis on the impact of information on the behavior of electricity customers and on the reduction of energy consumption, which is divided up into 4 groups according to their electricity consumption per month: 200-400kWh, 400-1000kWh, 1000-2000kWh, 2000-4000kWh. Along with the target group there will also be a control group of 500 households which will not receive smart electricity meters. This group will serve as a "reference" group for the comparison of data before and after the project. 4 research groups will be set up in the course of this study: 1) with smart metering, have been provided with the usual information package and additional information 2) with smart metering, have been provided with the usual information package and without additional information 3) without smart metering, have been provided with the usual information package and additional information 4) without smart metering, have been provided with the usual information package and without additional information.*