Residential Monitoring to Decrease Energy Use and Carbon Emissions in Europe - REMODECE

EIE/05/124/SI.419657

Start date of the action: 1 January 2006
End date of the action: 30 September 2008

www.isr.uc.pt/~remodece

ISR - Universidade de Coimbra

November 2008
OBJECTIVES OF THE PROJECT

- Partners involved: ISR-UC (PT), Enertech (FR), Fraunhofer ISI (GE), Energy Piano (DK), SINTEF (NO), Eneffect (BU), Seven (CZ), CRES (GR), ARCE (RO), ADENE (PT), ADEME (FR), e-ster (BE), CEU (HU) eERG (IT) and EDF (FR);
- 12 countries are involved;
- Development of an European Residential Electricity Consumption Database
- Development of a harmonised monitoring/surveying methodology
- Development of the Software tool: Home Energy Saver
- Evaluation of the potential electricity savings that can already be implemented by existing means;
- Analysis of market transformation for different types of equipment;
- Policy recommendations for each type of equipment.
OVERVIEW OF THE PROJECT

This project contributes to an increased understanding of current and impending electricity use by European households resulting from different types of equipment, consumers’ lifestyles, and comfort levels. The project evaluated how much electricity could be saved by the use of the most efficient appliances and by the reduction of standby consumption.

A large-scale monitoring campaign in 12 countries and a consumer survey have been carried out. The research focused mainly on new electronic loads such as: entertainment, information and communication technologies, standby consumption, lighting, as well as air conditioning in the Southern European countries. In Central and Eastern Europe, because of lack of reliable data, white appliances have also been targeted.
OUTCOMES OF THE PROJECT

- About 1,300 households have been monitored and 12,000 single appliances have been measured.
- About 6,200 questionnaires have been collected.
- Development of an European Residential Electricity Consumption Database able to contain the data from existing and future monitoring campaigns in the residential sector and from the survey, with daily and monthly average load profiles.
- Development of the HOME ENERGY SAVER, Software tool for calculation of the potential energy savings in households.
- Publication of a user-friendly guideline presenting several tips to save energy and practical buying guidelines: Electric Appliance Energy Guide
- Guideline on the selection of monitoring equipment
Residential Monitoring to Decrease Energy Use and Carbon Emissions in Europe

Scope
Although significant improvements in energy efficiency have been achieved in home and lighting this is not enough, the electricity consumption in the average EU-25 has been increasing by about 2% per year during the last 10 years. Some of the reasons for the increase in the residential sector electricity consumption are associated with a high basic comfort and level of amenities (particularly in the new EU member countries), the widespread utilization of relatively new types of loads whose penetration and use experience a very significant growth in recent years.

Objectives
The overall objective of the REMODECE project was to contribute to an increased understanding of the options for reducing electricity and carbon emissions in the residential sector.
Monitoring equipment Used
DISAGGREGATION OF END-USE ELECTRICITY CONSUMPTION
(Excluding Electric Space and Water Heating; 11% Standby consumption is embedded mostly in Entertainment and Office Equipment)
Age structure of Appliances

Type of lamps:

Average efficiency class of white appliances in EU-12
Daily Load Profiles

Electricity Consumption for the Average Day for a Typical Household in Europe

- Air conditioning
- Cooking
- Refrigeration
- Lighting
- Other
- PC & accessories
- Television
- Washing & drying
Daily Load Profiles

Electricity Consumption for the Average Day for a Typical Household in Europe

- Air conditioning
- Cooking
- Refrigeration
- Lighting
- Other
- PC & accessories
- Television
- Washing & drying

Supported by Intelligent Energy [©] Europe
Electricity savings potential per household and appliance, by switching to the BAT

Present value  BAT
The average electricity consumption per household per year (excluding space and water heating) was estimated to be 2700kWh. Electronic loads (office equipment and entertainment), are a key contributor to the electricity consumption representing 22% of the total electricity consumption. In basically all types of loads monitored there is wide range of performance levels, in the models available in the households.

By changing to Best Available Technology and/or Best Practice, the households can reduce their electricity consumption by about 1285kWh, representing 48% of their total consumption. The aggregated savings for the participating countries are roughly estimated to about 165 TWh.

Standby consumption is about 305kWh per year per household, representing 11% of the total electricity consumption.

The estimated reduction of electricity consumption is translated into 72 million ton of avoided CO2 emissions per year. At European level the savings potential would amount to around 268TWh.

Residential air conditioning loads are increasing fast and are already a major contributor to the summer peak demand in Mediterranean countries. The air conditioning market has been flooded with very low cost and very inefficient units, therefore needing urgent attention.

Regulation changes, information campaigns, with clear and simple messages targeting households, combined with incentives seem the best effective way to stimulate market transformation towards more energy efficient appliances, in the residential sector. More ambitious European Minimum Energy Standards on lighting and appliances and its rapid implementation are needed.