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FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

Department of Environmental Sciences and Engineering (DCEA)

Empowering customers from smart meters to policy instruments for a low carbon economy

Assessing the drivers for the reduction of energy consumption in households

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Objectives

The main objective of this PhD research is to understand the existing differences on energy consumption and for energy savings arising from different socio-demographic, climatic, technologic, behavioral and economic characteristics of residential aggregates on different scale levels. The knowledge of this drivers are of major importance not only in current policies performance but also on energy planning sustained by energy demand projections. Therefore one of the main questions to be addressed is how the energy consumption and energy savings drivers influence the performance / implementation of new and adequate policy instruments targeted to empowering customers as active energy and greenhouse gas emissions reductions agents in the residential sector.

Methodology

The methodology to accomplish this work will be fourfold: **1)** Literature review to identify approaches and results for other countries addressing residential energy consumption/savings drivers. Based on this analysis there will be acknowledged the main drivers and how they can be weighted either for the past energy consumption as well as for future projections of energy demand. **2)** Statistical analysis of long-term national household's energy consumption data. This task will also consider an in-depth analysis of data from smart meters. **3)** National and international energy policies review through content analysis. **4)** Perform the impact of energy saving policy instruments, focusing both technological and non-technological drivers on households, energy saving targets and on low carbon futures, through bottom up optimization TIMES_PT energy model.

Expected Results

This research work will deliver what kind of methodology is best suited to accommodate uncertainty and specific drivers of future residential end uses energy projections demand (Fig. 1). It will be identified what were the main trends on last decades on energy consumption for some EU countries (case study Portugal) (Fig. 2). Information from smart meters, combined with energy historic long-term data and climate, lifestyle and technological trends will be the basis to investigate the inner patterns of energy consumption in the residential sector. The energy policies review will allow to understand if the previous identified drivers are being considered and at what extent. Ultimately this work will unfold for different time and spatial scales the most relevant drivers that should be tackled by future policy instruments (behavioral, technological, etc.) for effective energy reduction consumption.

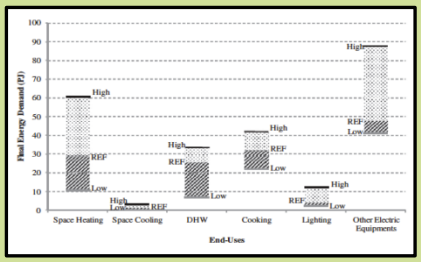

Fig.1 - Final energy consumption range between the REF and the highest and lowest variation scenario of each end-use in 2050

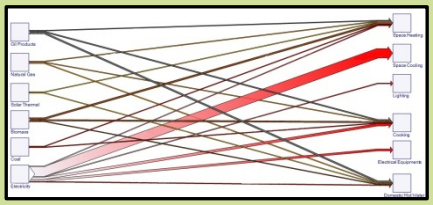

Fig.2 – Energy consumption profile of the Portuguese residential sector in 2010

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