

Identifying sustainable options from the household appliance industry, suitable to consumer's needs and preferences

Ricardo Santos¹, João Matias², Antonio Abreu³

Sustainable development, plays nowadays an important key role in our society, given its rising needs with energy and other resources, caused by factors such as population's growth, economic development, and technology progress.

Such needs, affects our sustainability, on its different dimensions, namely, economic, social and environment. Thus, the reduction of energy consumption is crucial to achieve sustainability, with buildings accounting for about 39 % of consumed energy, which represents an important sector to promote sustainability, by developing a set of solutions/measures.

Despite the existence of retrofitting measures within household appliances (e.g. Energy labeling), which were established in all over the world to promote energy efficiency and sustainability, there is a lack of approaches to support the consumer, by achieving sustainable appliances from the market, and suitable to their needs and preferences. The need of such support, arises, given the diversity of brands and models available on market, as well as the diversity of trade-offs, regarding the appliance's own features (e.g. energy and water consumption, cloth capacity, investment cost, etc.) as well as the consumer's preferences (e.g. design, reliability, perceived quality, etc.) and needs (e.g. heating, cooling, illuminance, etc.), specific associated with its case. To tackle the problem, we have developed an approach, based on Multi Attribute Value Theory (MAVT) and by

using evolutionary algorithms (NSGAII), to provide the consumer with sustainable solutions from the market, suitable to its needs and preferences. Issues, such as the consumer's comfort (visual, thermal, and acoustic), are also considered here, as well as the product life cycle assessment.

Furthermore, the approach developed here, allows the consumer to have different sustainable solutions from the market (also regarding the same energy service), to prevent situations such as the out of stock within some appliance.

1 — GOVCOPP, University of Aveiro
 2 — Department of Economics, Management, Industrial Engineering and Tourism & GOVCOPP, University of Aveiro
 3 — Department of Mechanical Engineering, ISEL- Instituto Superior de Engenharia de Lisboa, Instituto Politécnico de Lisboa

FIGURE 1
 Proposed approach .

