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CAMPAIGNS TO PROMOTE HOUSEHOLD ENERGY EFFICIENCY IN BARRANQUILLA (COLOMBIA)

CAMPAÑAS DE COMUNICACIÓN PÚBLICA PARA PROMOVER LA EFICIENCIA ENERGÉTICA EN LOS HOGARES DE BARRANQUILLA (COLOMBIA)

Idania Dorta Rodríguez[1]
E-mail: idorta@itsa.edu.co
ORCID: https://orcid.org/0000-0002-4611-0278
Juan José Cabello Eras[2]
E-mail: juancabellose@correo.unicordoba.edu.co
ORCID: https://orcid.org/0000-0003-0949-0862
[1] Institución Universitaria ITSA, Barranquilla, Colombia.
[2] Departamento de Ingeniería Mecánica, Facultad de Ingeniería, Universidad de Córdoba. Colombia.

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ABSTRACT

Addressing household energy efficiency is among the main challenges worldwide towards sustainable development. The residential sector is one of the main energy users globally and one of the most difficult to address. Barranquilla is the fourth most developed city in Colombia and has significant electricity consumption in households. However, currently, there are no campaigns promoting energy efficiency strategies to reduce household consumption. This study shows that most people in the city are aware of their electricity consumption, mainly because of the costs, which is also one main motivation to introduce energy efficiency strategies. A public campaign must prioritize social media and WEB communication channels. Moreover, energy efficiency strategies must focus on the use of air conditioners, refrigerators, and lighting systems. Moreover, since the cost of electricity and climate change are the main motivators for energy saving, the different measures proposed in a campaign should be associated with cost and carbon footprint savings.

Keywords: Public campaign, Marketing, energy efficiency, residential sector.

RESUMEN

Abordar la eficiencia energética de los hogares es uno de los principales retos a nivel global en la ruta hacia el desarrollo sostenible. El sector residencial es uno de los principales consumidores de energía a nivel mundial y uno de los más difíciles de abordar. Barranquilla es la cuarta ciudad más desarrollada de Colombia y tiene un consumo de electricidad residencial significativo. Sin embargo, actualmente no existen campañas que promuevan estrategias de eficiencia energética para reducir el consumo doméstico. Este estudio muestra que la mayoría de los habitantes de la ciudad son conscientes de su consumo de electricidad, principalmente debido a los costos económicos, lo que es también una motivación importante para introducir estrategias de eficiencia energética. Una campaña pública debe priorizar las redes sociales y a los canales de comunicación WEB. Además, las estrategias de eficiencia energética deben centrarse en el uso de aparatos de aire acondicionado, equipos de refrigeración doméstica y sistemas de iluminación. Además, dado que el costo de la electricidad y el cambio climático son las principales motivaciones para el ahorro energético, las diferentes medidas propuestas en una campaña deben estar asociadas al ahorro económico y a la reducción de la huella de carbono.

Palabras clave: Campaña pública, Marketing, eficiencia energética, sector residencial.

INTRODUCTION

The residential demand for electricity accounted for 26 to 28% of the global consumption between 1990 and 2019 (IEA, 2022), while in Colombia reduced from 42% in 2006 to 39% in 2015 (UPME, 2022). However, different barriers, like misplaced incentives, lack of awareness and information, market-related barriers, and financial barriers, preclude the implementation of frequently profitable HEE (Bianco and Sonvilla, 2021).

Considering reference efficiency or the best available technology efficiency, the residential final energy consumption (including all energy sources) can be reduced by 56 to 70% (UPME et al., 2019). Particularly, electricity accounts for 31% of the energy mix in the residential sector, wood accounts for 46%, and natural gas for 17%. Most of this saving potential is related to the use of wood for cooking, mainly in rural areas (UPME, 2020). Overall, the saving potential is estimated at 145,996 to 182,321 TJ, equivalent to 1,643 to 2.357 million USD (UPME et al., 2019).

In Colombia, cities are categorized into 6 strata according to their income. Strata 1 to 3 account for 84% of the residential electricity consumption, averaging 566 kWh per capita, while strata 4 to 6 account for 16 of the residential electricity consumption, averaging 1,577 kWh per capita (DANE, 2018; UPME, 2019). In particular, the Atlantic Department has the highest residential electricity consumption per capita in the country (DANE, 2018; UPME, 2019), mainly because of the extensive use of HVAC systems for air conditioning. Moreover, the cost of electricity in the city increased by 62.5% since 2021 (Alcaldía de Barranquilla, 2022). Consequently, introducing household energy efficiency (HEE) measures in the residential sector in Barranquilla is instrumental in achieving sustainable development.

Household energy efficiency (HEE) is promoted through different approaches, including fiscal incentives, access to finance, grants, subsidies, pricing tariffs, rewards, advertising, workshops, modifying social norms, behavioral change interventions, demonstration projects, household engineering modifications, energy audits, and the combination of activities (McAndrew et al., 2021). Defining which of these approaches is the most adequate to promote HEE is a cornerstone for policymakers since using new and more efficient technologies does not guarantee higher efficiency standards when household users are unaware of how to use them efficiently (McAndrew et al., 2021). It is indicated to implement segmented and targeted HEE interventions to impact a broader and more diverse range of population groups while considering aspects like comfort, health, and well-being (McAndrew et al., 2021).

Public communication campaigns, which can be defined as "planned attempts to change specific behaviors in targeted audiences within specific time frames, through different communication activities aiming at advertising particular messages to produce benefits to individuals and society", are one main tool to promote energy saving in general (Borawska et al., 2022). While different studies show the positive impact on energy savings resulting from positively modifying human behavior, there are different barriers precluding traditional media campaigns from using simple dissemination of information to achieve lasting behavioral changes. In general, communication campaigns aiming at energy conservation targets promote changes in individual consumer behaviors by presenting more efficient behavior patterns and habits. For example, in Ireland, a campaign based on one leaflet attached to customers' bills motivated a reduction in natural gas consumption from 1.6% to 2.1% in one year (Diffney et al., 2009). Moreover, an HEE campaign to introduce low-cost or no-cost measures in low-income households in households averaging around 2000 kWh per annum, found that letters and in-home displays were the preferred systems to receive consumption feedback, while environmental factors and money were the main motivations for energy-saving (Vassileva and Campillo, 2014).

An important aspect of campaigns to deal with consumer diversity is segmenting larger heterogeneous population groups into smaller more homogenous subgroups (i.e., groups similarly responding to commodities and marketing messages) (Moss and M.Cubed, 2008). This addresses the necessity to communicate and motivate action more effectively within an increasingly heterogeneous population relying on a rapidly growing number of communication channels. Some characteristics of households, mainly for low-income families, must be considered (Moss and M.Cubed, 2008):

- Might not own their households
- Use old or inadequate equipment
- Are poorly educated on energy uses
- Have little time to manage their energy use.

This study aims at identifying and necessity and adequate approaches for an HEE campaign in the city of Barranquilla.

MATERIALS AND METHODS

The success of communication campaigns depends largely on the message (Wymer, 2011). Pretesting the different campaign messages requires the use of different methods to assess the impact of messages on the target

audience, identifying the more effective elements to communicate and influence positive behavioral patterns and habits and technology modifications depending on the campaign goals (Lee and Kotler, 2020; Nedra Kline Weinreich, 2011). This study uses a survey to identify the awareness level of citizens regarding HEE. Moreover, the survey looks for the most adequate communication channels to reach different population groups depending on their stratum and age range and which messages are more indicated. Table 1 shows some considerations used to develop the survey.

Table 1. Indicators for assessing the effectiveness of the communication campaign (Source: Borawska et al., 2022).

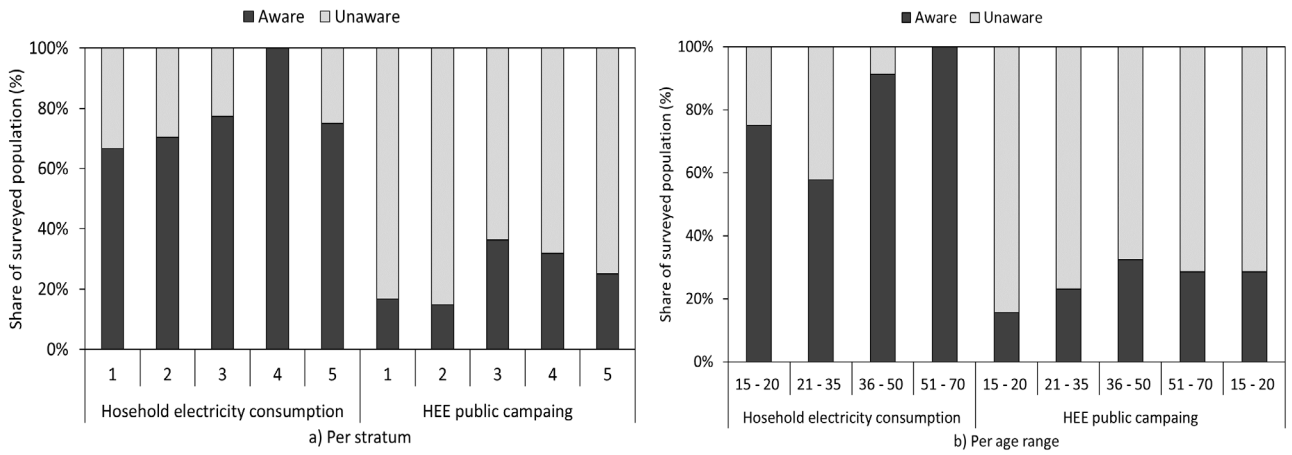
Indicator	Measure	Tools
Awareness	Share of individuals showing awareness of HEE	Audience surveys
Engagement	Share of individuals involved in debates and dialogues around HEE. Share of individuals taking action to complement their knowledge of HEE	Audience surveys Behavioral data (e.g., website hits)
Behavioral change	Share of individuals reporting behavioral changes	Audience surveys
Social norm	Share of individuals with positive attitudes towards the HEE campaign	Audience surveys Observations
Wellbeing	Share growth in the social outcome. Share growth in the environmental outcome	Epidemiological data Environmental data

Source: own elaboration

RESULTS AND DISCUSSION

Following, the results of the surveys applied are discussed. Fig. 1 shows the awareness of household electricity consumption and HEE public campaigns in the city.

Fig. 1: Awareness of household electricity and HEE public campaigns.

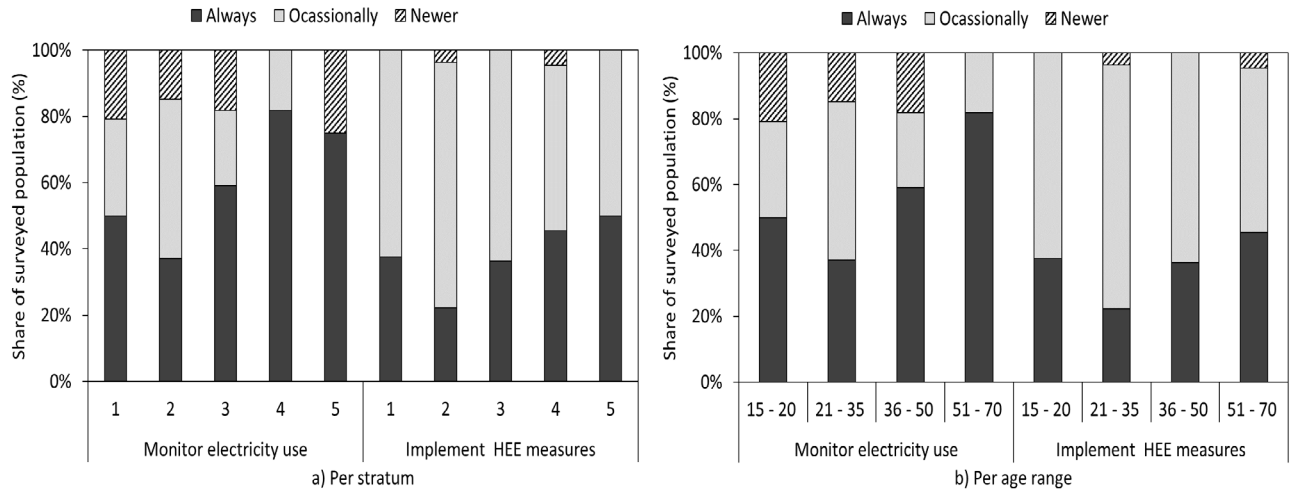


Source: own elaboration.

Results show that 60% to 100% of people are aware, mainly in 36 to 50 years and 51 to 70 years. However, less than 40% of people know public campaigns promoting HEE.

Figure 2, shows the level of awareness and interest in HEE campaigns.

Fig. 2: Share of the population monitoring and controlling household electricity efficiency.

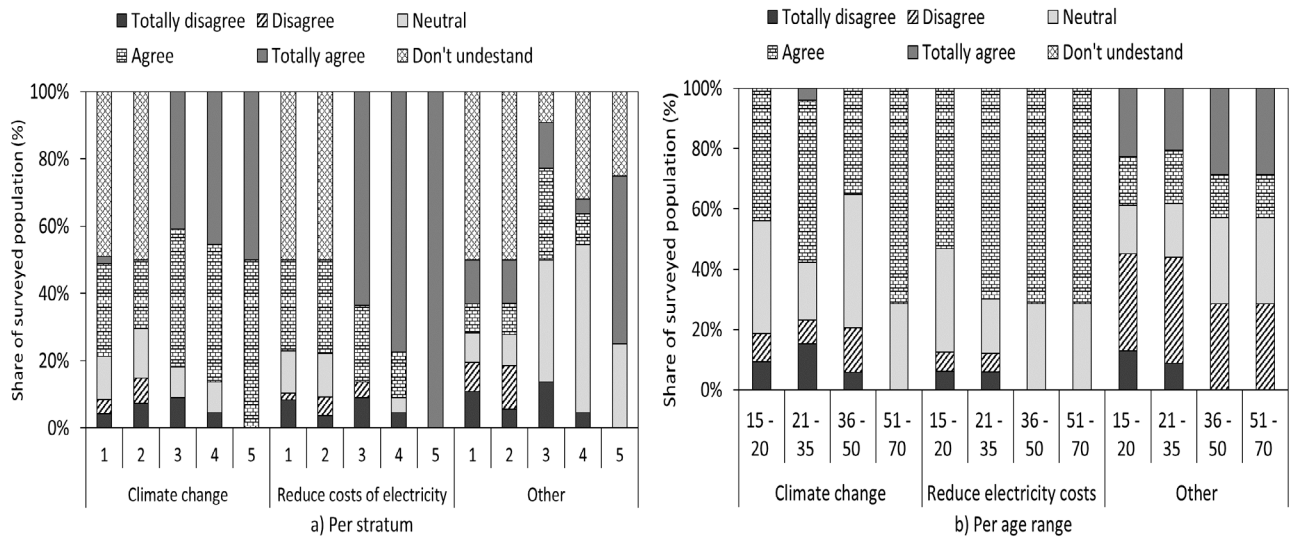


Source: Own elaboration.

Results show that in strata 4 and 5 (with the highest costs of electricity), over 70% of the population always monitors electricity consumption. Moreover, from 22 to 50% of the population implements HEE measures.

Figure 3 shows the main motivations considered for implementing HEE measures.

Fig. 3. Motivations to implement HEE measures.



Source: Own elaboration.

Results show that the cost of electricity is the main reason driving the implementation of HEE measures in all age ranges, while climate change is significant mainly in strata 3, 4, and 5.

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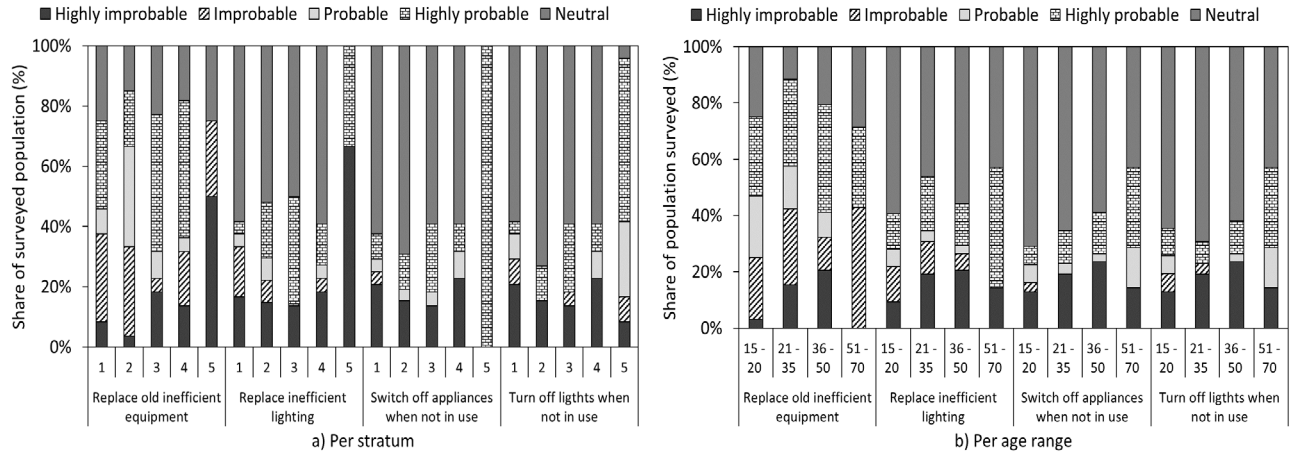
Figure 4 shows the most implemented measures on households in the city.

Fig. 4: Most implemented HEE measures.

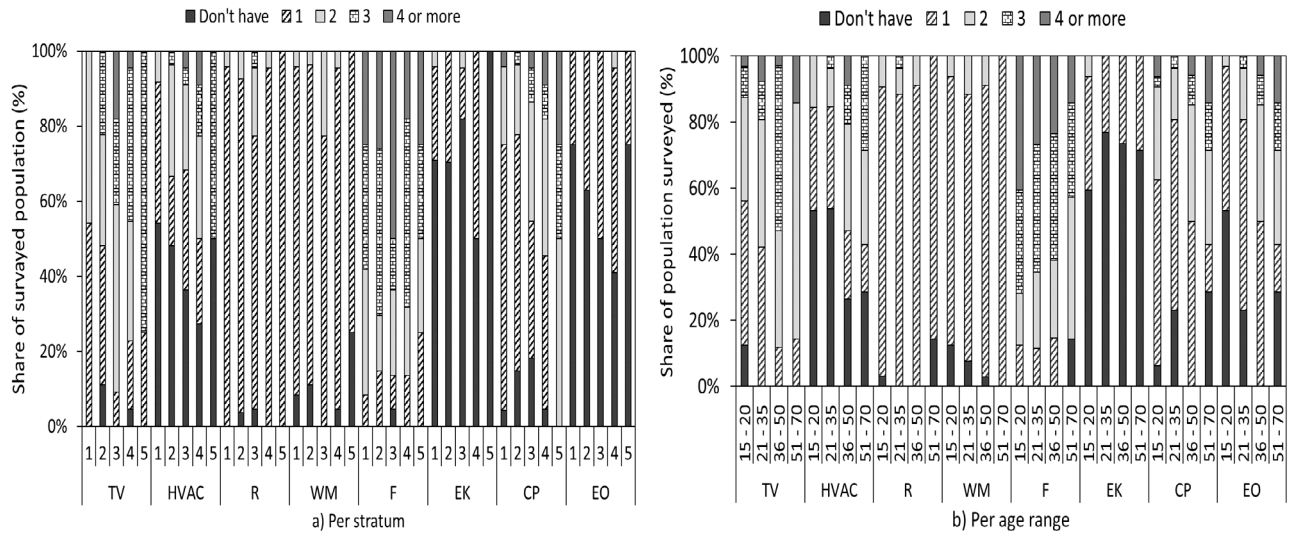


Source: Own elaboration.

Results show that replacing old equipment is the main HEE strategy except for people between 51 and 70 years old. Other HEE measures are less implemented.

Figure 5 shows the main equipment available in households.

Fig. 5. Household electro-domestic equipment.



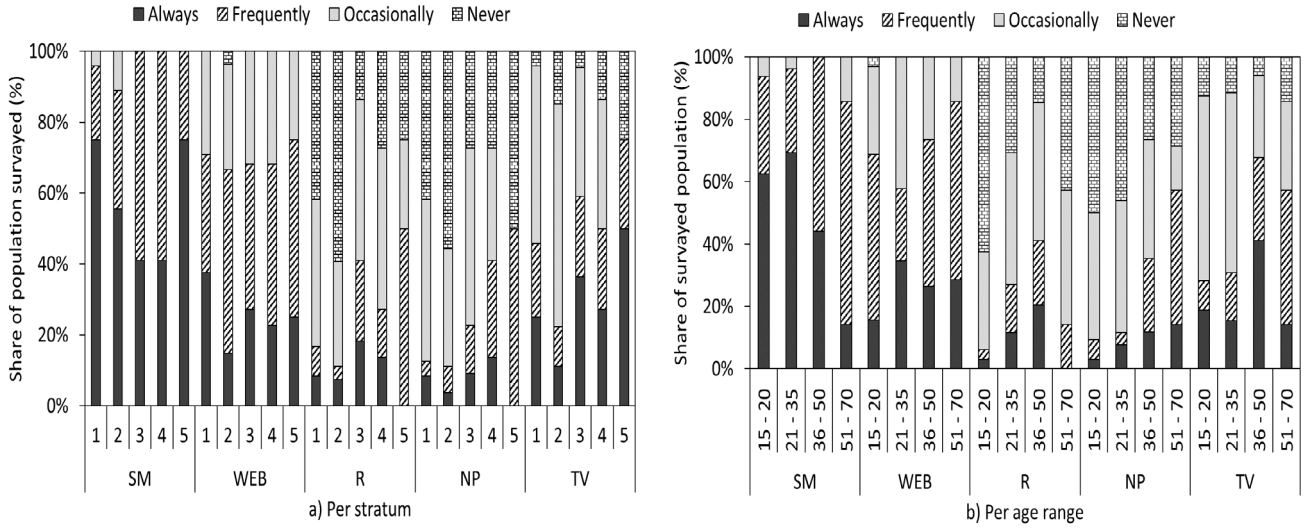
* R – refrigerator, WM – washing machine, F – fans, EK – electric kitchen, CP – computers and printers, EO – electric oven

Source: Own elaboration.

Results show that 96% of the people have a TV, while 58% have HVAC systems for air conditioning. Moreover, 98% of the people have refrigerators, 93% have washing machines, 30% have electric kitchens, 90% have computers and printers, and 41% have electric ovens.

Fig. 6 shows the main information channels used by people in the city.

Fig. 6. Information channels used.



* SM – social media (Facebook, Twitter, Instagram, WhatsApp), WEB – digital newspapers and blogs, R – radio

NP – newspapers

Source: Own elaboration.

Results show that social media and the WEB are the main information channels used, predominantly among younger people. Other channels like the radio, the newspapers, and TV are generally less used. Older people in higher strata show the highest use of these systems in these cases.

Overall, between 67 and 100% of the people surveyed in different strata are interested in learning more about how to improve HEE.

CONCLUSIONS

This study shows the need for an HEE campaign in the residential sector in Barranquilla. The study concludes that the campaign must focus on social media and WEB communication channels. Additionally, the campaign needs to focus on efficiency strategies for HVAC air conditioners, refrigerators, and lighting systems. Moreover, since the cost of electricity and climate change are the main motivators for energy saving, the measures proposed in a campaign should be associated with cost and carbon footprint savings.

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