

Challenges and Proposals for Public Policies Aimed At Increasing Energy Efficiency in Low-Income Communities in Brazil: A Multi-Criteria Approach

Authors : Anna Carolina De Paula Sermarini, Rodrigo Flora Calili

Abstract : Energy Efficiency (EE) needs investments, new technologies, greater awareness and management on the side of citizens and organizations, and more planning. However, this issue is usually remembered and discussed only in moments of energy crises, and opportunities are missed to take better advantage of the potential of EE in the various sectors of the economy. In addition, there is little concern about the subject among the less favored classes, especially in low-income communities. Accordingly, this article presents suggestions for public policies that aim to increase EE for low-income housing and communities based on international and national experiences. After reviewing the literature, eight policies were listed, and to evaluate them; a multicriteria decision model was developed using the AHP (Analytical Hierarchy Process) and TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) methods, combined with fuzzy logic. Nine experts analyzed the policies according to 9 criteria: economic impact, social impact, environmental impact, previous experience, the difficulty of implementation, possibility/ease of monitoring and evaluating the policies, expected impact, political risks, and public governance and sustainability of the sector. The results found in order of preference are (i) Incentive program for equipment replacement; (ii) Community awareness program; (iii) EE Program with a greater focus on low income; (iv) Staggered and compulsory certification of social interest buildings; (v) Programs for the expansion of smart metering, energy monitoring and digitalization; (vi) Financing program for construction and retrofitting of houses with the emphasis on EE; (vii) Income tax deduction for investment in EE projects in low-income households made by companies; (viii) White certificates of energy for low-income. First, the policy of equipment substitution has been employed in Brazil and the world and has proven effective in promoting EE. For implementation, efforts are needed from the federal and state governments, which can encourage companies to reduce prices, and provide some type of aid for the purchase of such equipment. In second place is the community awareness program, promoting socio-educational actions on EE concepts and with energy conservation tips. This policy is simple to implement and has already been used by many distribution utilities in Brazil. It can be carried out through bids defined by the government in specific areas, being executed by third sector companies with public and private resources. Third on the list is the proposal to continue the Energy Efficiency Program (which obliges electric energy companies to allocate resources for research in the area) by suggesting the return of the mandatory investment of 60% of the resources in projects for low income. It is also relatively simple to implement, requiring efforts by the federal government to make it mandatory, and on the part of the distributors, compliance is needed. The success of the suggestions depends on changes in the established rules and efforts from the interested parties. For future work, we suggest the development of pilot projects in low-income communities in Brazil and the application of other multicriteria decision support methods to compare the results obtained in this study.

Keywords : energy efficiency, low-income community, public policy, multicriteria decision making

Conference Title : ICEP 2022 : International Conference on Energy Planning

Conference Location : San Francisco, United States

Conference Dates : September 27-28, 2022