

ENERGY POVERTY IN BRAZIL: A CASE STUDY FROM EXPENDITURE AND SELF-REPORTED PERSPECTIVE

MARCOJE, B. M., UFF, +552199901-4180, beatriz_marcoje@hotmail.com
HALLACK, M. C. C., PPGE-UFF, michellehallack@gmail.com
MACHADO, D. C. PPGE-UFF, danicarusimachado@gmail.com
MEJDALANI, A., PPGE-UFF, a.mejdalani@gmail.com

Overview

This work aims to discuss energy poverty focusing on the importance of the energy to promote indoor thermal comfort and well-being. Traditionally, the studies on energy deprivation in developing countries is mainly focused on the persistent deficiency of energy infrastructure to provide energy in rural regions in Africa, Asia and South America. The questions addressed by these studies includes, for instance, the social costs, the technologies and the policies to deal with these lack of infrastructure (Lee et al. 1999; Pereira et al 2010; Cook, 2011). In this context, most of the energy poverty research is focused on the supply-side. Recently, the concept of access has been enlarged, including other dimensions, like availability (continuity of supply), affordability, quality and legality (Bhatia, et. al., 2015). In developed countries, the energy poverty has been seen as a problem of affordability. In other words, the affordability problem addresses how low-income households with low-energy efficiency deal with high or increasing energy prices (Bouzarovski and Petrova, 2015).

The lack of heating has been the main focus of these researches because of its recognized health impact. However, recently, cooling starts emerge as a question of interest, and particularly the relationship between energy efficiency and energy poverty.

This article aims to contribute arguing that energy poverty is a multi-dimensional concept (EU Energy Poverty Observatory, 2018) and reflects “an inability to realize essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy service, and taking into account available reasonable alternative means of realizing these capabilities” (Day et al., 2016, p. 260). In developing countries, as in developed countries, there are consumers who have access to the energy network, but are not able to afford basic services. In this context, accessibility and affordability are the great concern in energy poverty. In this context, to understand energy poverty, we need a study energy services in depth.

Most of literature concerning thermal comfort as a criterium to discuss energy poverty focus on countries with severe cold weather. Even in these countries, there was an increasing debate to include variables related to comfort and thermal relief during summer time, like the existence and the use of air conditioning in households. Moreover, most of the literature deal with the question from an income perspective, taking into account energy expenditure as a measure of energy poverty. Usually, it is assumed that the poor should consume less energy, however, houses in low income neighborhoods and with low energy efficiency demand much more energy to achieve thermal comfort.

This paper focus on the Metropolitan Area of Rio de Janeiro, Brazil, noticeable for its huge wealth inequality (the average income of the of 10 richest neighborhoods of Rio de Janeiro is ten times higher than the average income of the 10 poorest neighborhoods) and extreme high temperatures during the summer (in December of 2016, it achieved 49,3°C thermal sensation). Moreover, as noticed by Lucena (2014), temperature differences among neighborhood in Rio de Janeiro can be as high as 8°C due to different urbanization patterns. This reflects, for instance, in a heterogeneous energy demand.

Our study assesses the energy poverty problem in Rio de Janeiro considering income/expenditure measures, as Boardman (2010) and also self-reported individual perspectives, following the methodology applied by Phimister et al. (2015). We also consider the metric of absolute energy needs satisfaction, as developed by Ochoa (2014) and the indicators of the EU Energy Poverty Observatory (2018).

Methods

Considering energy poverty as a multi-dimensional concept that need a bundle of indicators to capture different aspects of the phenomenon, we applied a survey with subjective and objective questions to identify energy poverty in people living at Metropolitan Region of Rio de Janeiro. This survey allowed us to make an exploratory analysis of household temperature comfort. We focused in identifying the amount of people suffering of thermal discomfort and what are the restrictions people face in their home caused by extreme temperature.

The survey was divided in four sections, the first one aims to identify general information about the household, like number of dwellers, equipped fan and air conditioning, family income and energy cost. The second one analyzes the thermal sensation, with questions about if the household is very hot and about the difficulties in cooling. The third sections is about thermal discomfort. Thus, we asked questions if the temperature has limited them in their indoor current activities, as sleeping, working and studying. Moreover, we asked if they change their habits or avoid to be

indoor because of the high temperatures. The fourth aims to understand how the person feels about the energy services. In the energy expenditure/income measure, we use the energy expenses as 10% of total income as the boundary to define energy poverty (Boardman, 2010). In the individual subjective measure about household thermal comfort, we use a combination of indicators, based in studies like: Phimister et al. (2015), Ochoa (2014) and the indicators of the EU Energy Poverty Observatory.

Results

In our survey, we could identify that energy poverty is a reality in Metropolitan Region of Rio de Janeiro under expenditure/income criterium and considering the self-reported criterium. We show that people suffer with excessive high temperatures inside their houses and they have difficulties to cool the house. Moreover, a large number of people change their habits because of the high temperatures. Considering the energy expenditure, many people reported difficulty in keeping the payment of the account in the last 12 months and have already had to reduce other essential expenses to be able to pay the bill of light.

We show that people suffering from energy poverty tend to have lower income and higher expenses with energy. The average income of our survey was higher than the population, so this results can be underestimating the problem for low-income population.

Moreover, we show that there is no specific policy to actual deal with this problem in Brazil. The main energy poverty measures focused on people with really low income, in our survey, few people have the right to use the special tariff for low income consumers. Besides that, the logic for low income tariffs is based on the idea that poorer houses consume less energy, which we show that it is not true in Rio de Janeiro.

Conclusions

From this exploratory study we can infer that we must explore others aspects of energy poverty, particularly in places with hot weather, as in the Metropolitan Region of Rio de Janeiro. Moreover, the problem of energy poverty in Rio de Janeiro increased in the last decades and it will probably become a major issue in the future in the face of the urban heat islands. This generates thermal discomfort from which people cannot avoid. In line with international experience, such cases should be considered and treated as energy poverty, and as such, an adequate policy should be promoted. This challenge should be understood as part of the problem related to defaults and, in some degree, to illegal connection, which demands policies to promote the access to an affordable and reliable energy service to alleviate thermal distress.

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