



## ENERGY JUSTICE: CONCEPTS, METRICS AND AN EXERCISE OF ESPACIALIZATION OF INDICATORS IN THE STATE OF SÃO PAULO

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### Abstract

The aim of this work is to offer a review on the concept of energy justice and to analyze, through an exercise of geographical spatialization, the main socio-economic indicators for the State of São Paulo from 2000 to 2010. In addition, results of "Programa Luz para Todos" (PLpT - a Brazilian Federal government program aiming to expand electric energy access) are verified and quantitatively for the period of 2004 to 2010. Results are analyzed from an energy justice standpoint. This is an essential concept in approaches to human development that have to do with satisfaction of basic needs - such as food, health, education and housing (Herrera et al., 2004). The results can also be analyzed with respect to the 7th Sustainable Development Goal (SDG 7), which regards clean and accessible energy. Conclusions of this research point out that PLpT can be understood as an initiative that contributes to distributive justice, through improved access to electric energy by the population, favoring, throughout the period of analysis, increased satisfaction one of the basic needs, being an effective national policy for the fulfillment the scope of SDG 7.

### Key words:

Energy Justice; Energy Poverty; Programa Luz para Todos; Sustainable Development Goals; SDG 7.

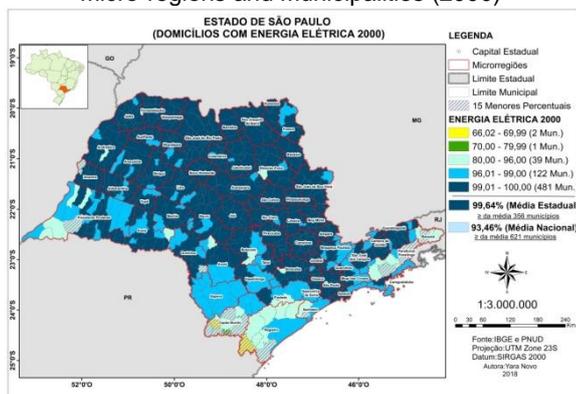
### Introduction

Herrera *et al.* (1976) have shown that food, health, education and housing compose the basic needs, whose satisfaction is a necessary, though not sufficient, condition for human development. To meet them and to achieve energy justice, a broad set of services is indispensable. Clean and accessible energy is one of the 17 Sustainable Development Goals. The aim of this work is to identify, treat and spatialize data from "Luz para Todos" (Light for All) program (PLpT) from 2004 to 2010 and the evolution of access to electric power that may be related to PLpT in the State of São Paulo. Results are analyzed in the light of basic needs, energy justice and SDG conceptual perspectives.

### Results and Discussion

The results indicate that lowest rates of access to electricity in 2000 were concentrated in the micro-regions of "Registro" and "Capão Bonito", especially in the municipality of "Barra do Turvo", where access to electricity benefited only 66% of the households, the lowest in the State (Figure 1).

Figure 1. Access to electricity in the State of São Paulo: Micro-regions and Municipalities (2000)

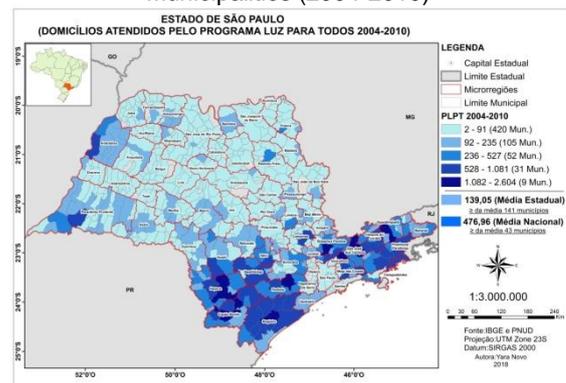


Source: by authors, prepared from UNDP data, using ArcGIS 10.3 software (ESRI, 2014).

Figure 2 shows the importance of PLpT Program, especially in municipalities with lowest indexes.

Spatialized data on electricity connections by PLpT allow identifying a better diffusion of energy access.

Figure 2. Number of connections made by PLpT: Municipalities (2004-2010)



Source: by authors, based on PLpT data, from PBDA (2018), using ArcGIS 10.3 software (ESRI, 2014).

### Conclusions

The spatialization allowed identifying the improvement of the indicator of access to electric energy in the State of São Paulo. The broadening of access coverage occurred with the implementation of PLpT. This Program has contributed, throughout the period of analysis, with increased satisfaction one of the basic needs, being an effective national policy for the fulfillment the scope of SDG 7 in the State. Identifying regions vulnerable to energy access, this methodology can serve as an instrument to inform public policies in energy access.

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