

IEA-EGRD Workshop "Social Impacts of Clean Energy Policies"

# How can energy efficiency programs mitigate energy poverty and socioeconomic disparities?

Energy Economic Studies Department May 2023

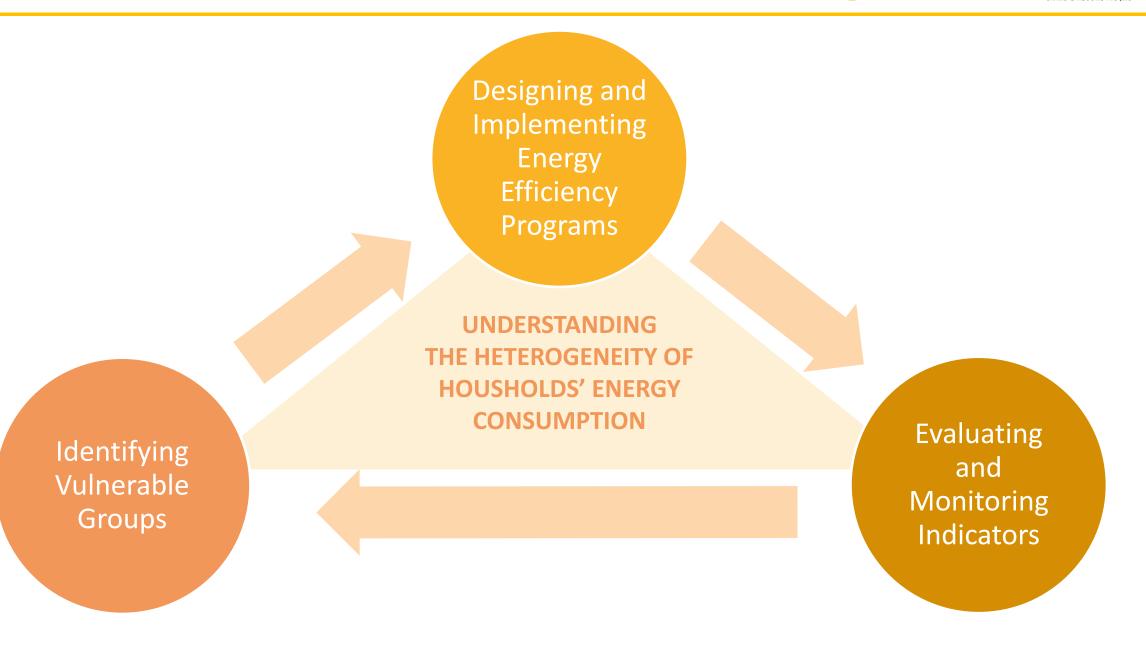
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### **Steps for Implementing Energy Efficiency Programs**



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# EPE's Fact Sheet Residential Electricity Consumption by Income Classes



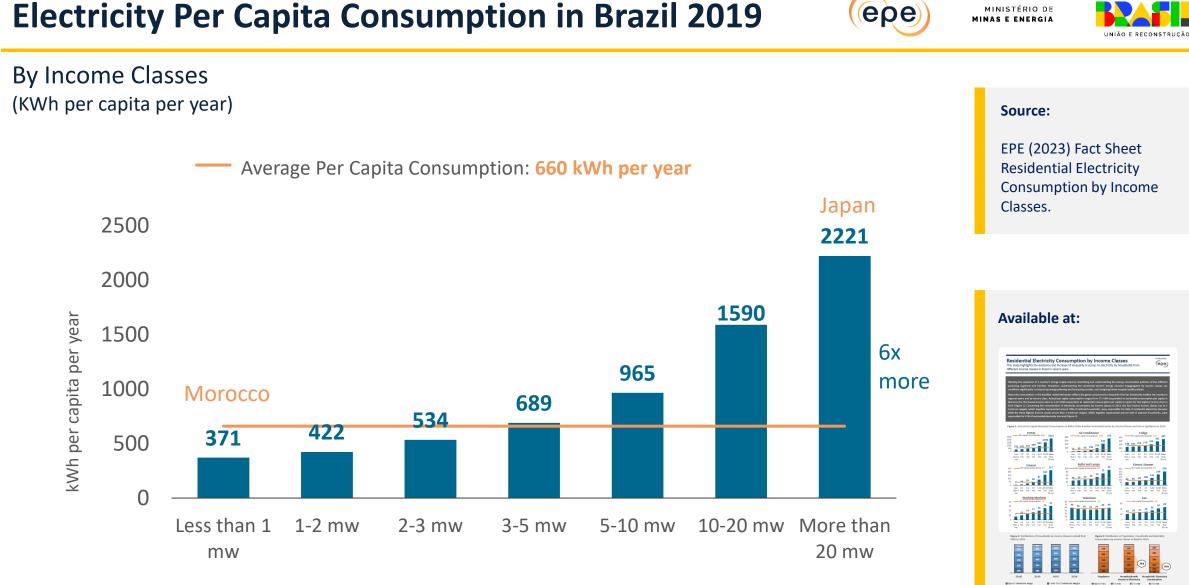
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### Methodology:

- Bottom-Up Estimation Approach
- EPE's Energy Demand Model

### Data:

- National Electrical Energy Conservation Program (PROCEL)
  - Survey on Ownership and Usage Habits of Home Appliances in the Residential Sector PPH (2005 and 2019)
- Brazilian Institute for Geography and Statistics (IBGE)
  - National Household Sample Survey PNAD (2005 2015)
  - Continuous National Household Sample Survey PNADC (2016 2019)



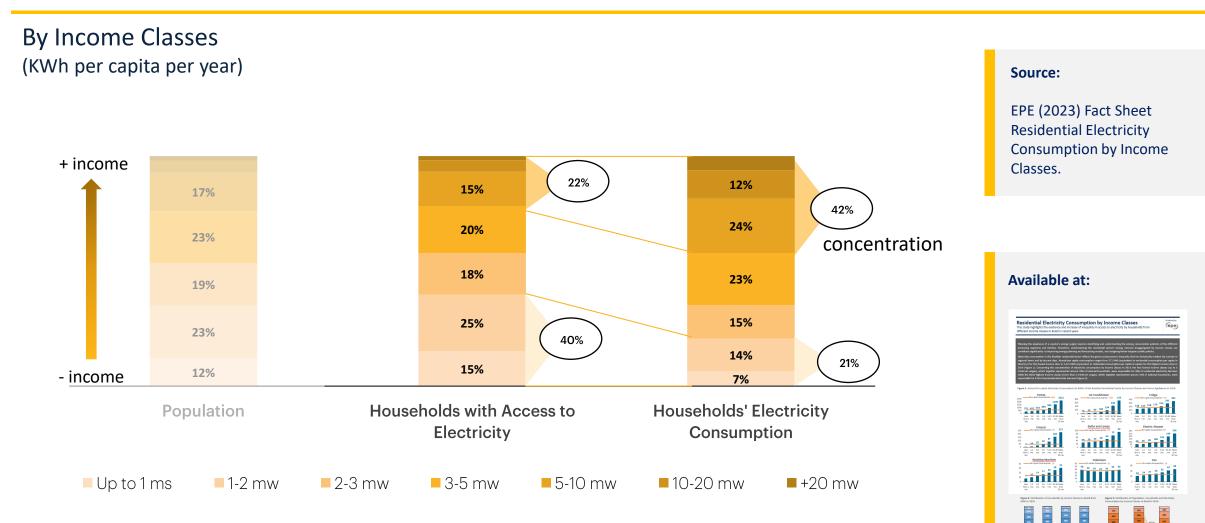
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In January 2019, the Brazilian minimum wage was BR\$ 998, equivalent to US\$ 273.

**Note:** By mw, please interpret it as "minimum wage(s)".

# Electricity Consumption Concentration in Brazil 2019 (epe)

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**Note:** By mw, please interpret it as "minimum wage(s)".

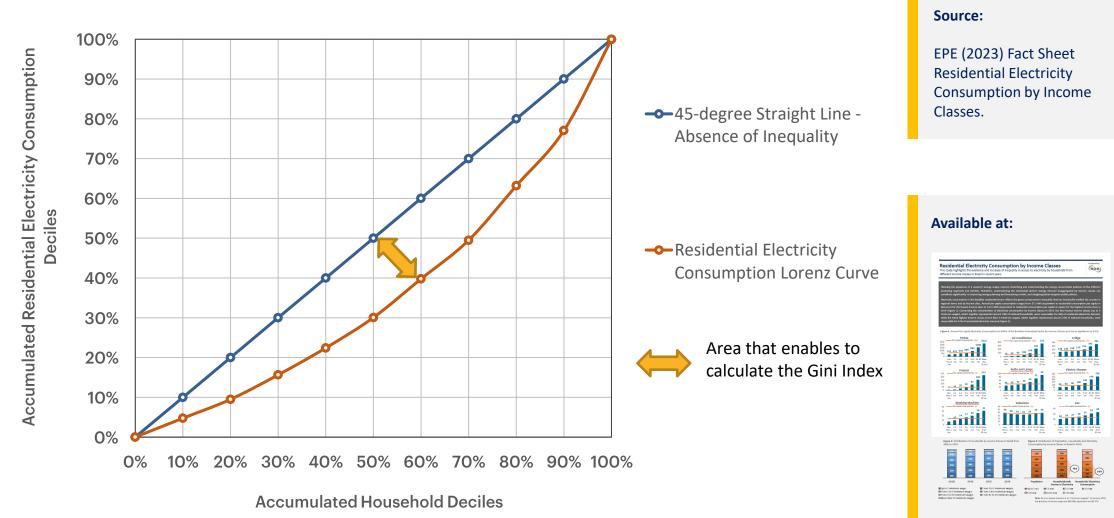
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epe

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### The Lorenz Curve for Brazil 2019



### **Residential Electricity Consumption Gini Index**

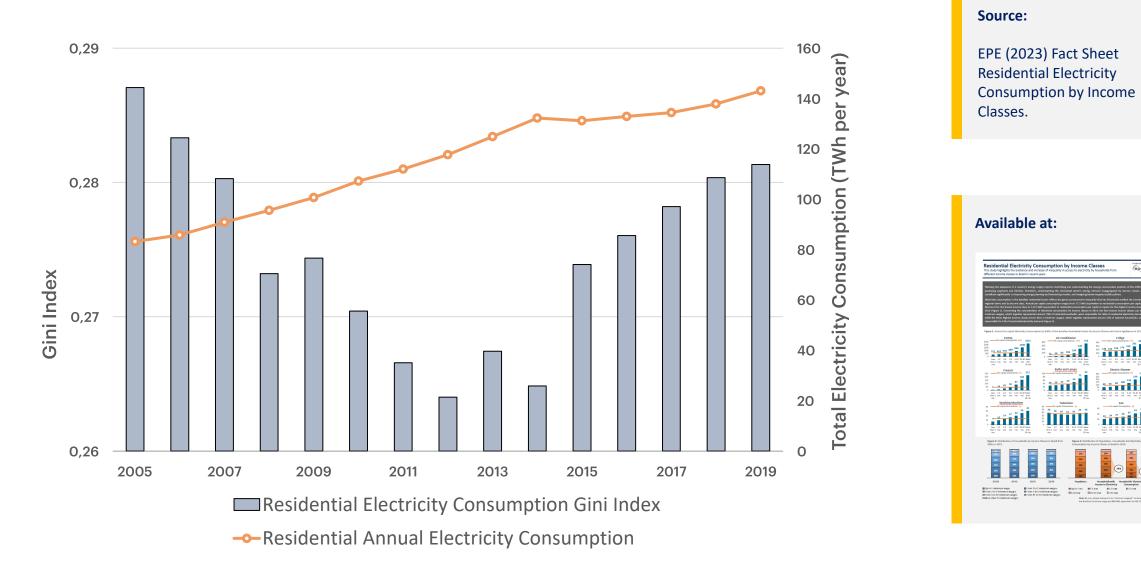


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### Gini Index and Electricity Consumption Evolution in Brazil 2005-2019

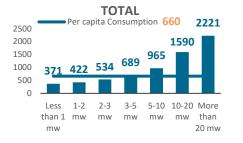




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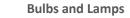
# By Home Appliances and Income Classes (KWh per capita)





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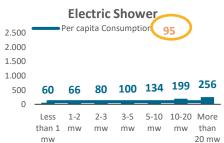
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#### Source:

EPE (2023) Fact Sheet Residential Electricity Consumption by Income Classes.

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Note: By mw, please interpret it as "minimum wage(s)".

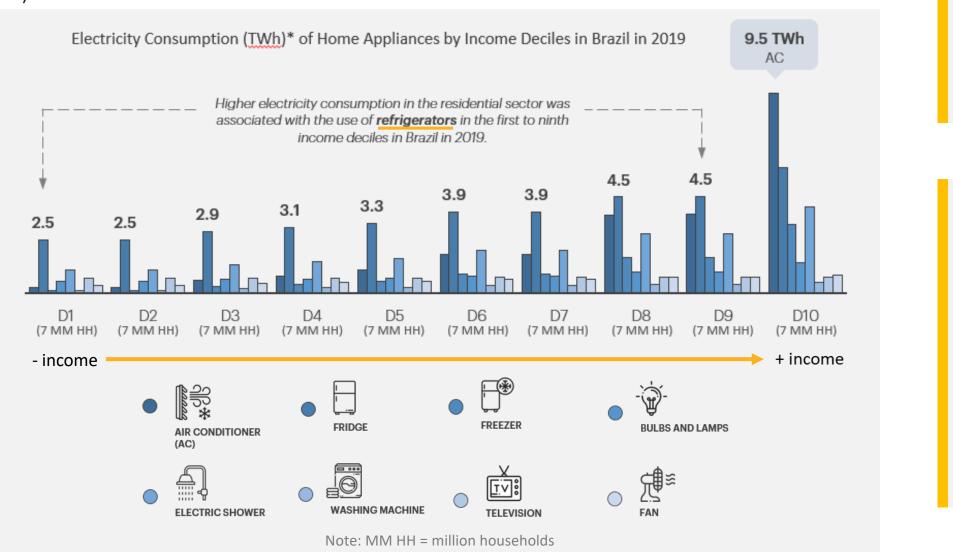
In January 2019, the Brazilian minimum wage was BR\$ 998, equivalent to US\$ 273.

# **Total Electricity Consumption in Brazil 2019**



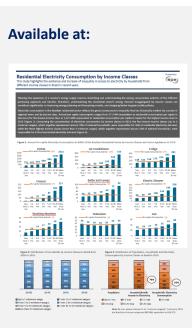
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# By Home Appliances and Income Deciles (TWh)



#### Source:

EPE (2023) Fact Sheet Residential Electricity Consumption by Income Classes.



#### Source:

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EPE (2023) Fact Sheet **Residential Electricity** Consumption by Income Classes.

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- Energy access does not depend only on the connection to the grid. Energy services also must be affordable, as highlighted in the SDG 7.
- Socioeconomic restrictions experienced by lower-income households lead to a restrained demand for energy services.
- Income distribution inequality is reflected in the households' electricity consumption patterns.
- Lower income households tend to present fewer home appliances with lower power or more restrictive usage habits in order to spend less money paying their electricity bill.

### **Key Research Findings**



- Residential Sector's Electrical Gini Index is a powerful tool for monitoring the inequality in access to energy services.
- It is key to collect periodically data on the ownership, power and use habits of home appliances by income classes, regions and other household conditions.
- Understanding the residential sector's electricity consumption heterogeneity by income classes can help to :
  - design more effective and lower costly energy efficiency and subsidy policies.
  - improve energy demand forecasting models and energy planning.
  - address the national sustainable development agenda and achieve its established goals (as the SDG 7).



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The fact sheet is available at EPE's Website.

# Thank you!



# www.epe.gov.br

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