

# 10th German-Brazilian Dialogue on Science, Research and Innovation

(v 1.1)



10th  
German-Brazilian  
Dialogue on  
Science, Research  
and Innovation



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Electric Power Research Center - Cepel

# Session

***How to Alleviate Financial Burdens for Low-income Households  
and Energy Intensive Industry***

**Title of presentation:**

***Energy Transition and Energy Poverty in Brazil***



# Energy Transition

## Hegemonic View

Any solution to climate change is likely to be based on a combination of four elements:



Lower power consumption



Better efficiency



switching from fossil fuels to other forms of energy and capture



And carbon storage



Source: Friedrichs, J. (2013). *The Future Is Not What It Used to Be: Climate Change and Energy Scarcity*. Cambridge, MA: MIT Press.

# Energy Transition

## Critique of the Hegemonic View



Does not address behavior issues



Heavily focused on technology



Social questions are secondary



Does not address historical questions



Issues associated with ethics and justice are not covered or are incipient



Source: Foto - A Desigualdade Mata - Oxfam International 2022.

# FAIR ENERGY TRANSITION

*for all*



*It is not possible to talk about energy transition in the world or in Brazil without first equating energy poverty, otherwise, it is a **dead concept***

# Energy Poverty



# Energy Poverty – Recent Advances

Brazi

Program/Action	Leader
Program for Energy Development in the States and Municipalities "PRODEEM"	MME/Eletrobras
National Rural Electrification Program "Luz no Campo" (Light in the Field)	MME/Eletrobras
Production Community Center Project - "CCP"	Eletrobras
Light for All Program	MME/Eletrobras
Program "More Light for the Amazon"	MME/Eletrobras
National Program of Electric Energy Conservation - Procel	Eletrobras
Social Tariff for Energy - TSSE	ANEEL
Subsidized Financing for Efficient Equipment (Ex. refrigerator)	Ministry of the Environment/Eletrobras-Procel
Program for the Development of Distributed Generation of Electric Energy (ProGD)	MME
Gas Aid Program	Bank Caixa Econômica Federal
Support for the Development of Eco-stoves	MME/ANEEL
Support for Research and Development	MME/ANEEL/Eletrobras

# Energy Poverty – Recent Advances

## General Data

Historical Access to Electricity - % of population (Brazil, Russia, India, China & South Africa)

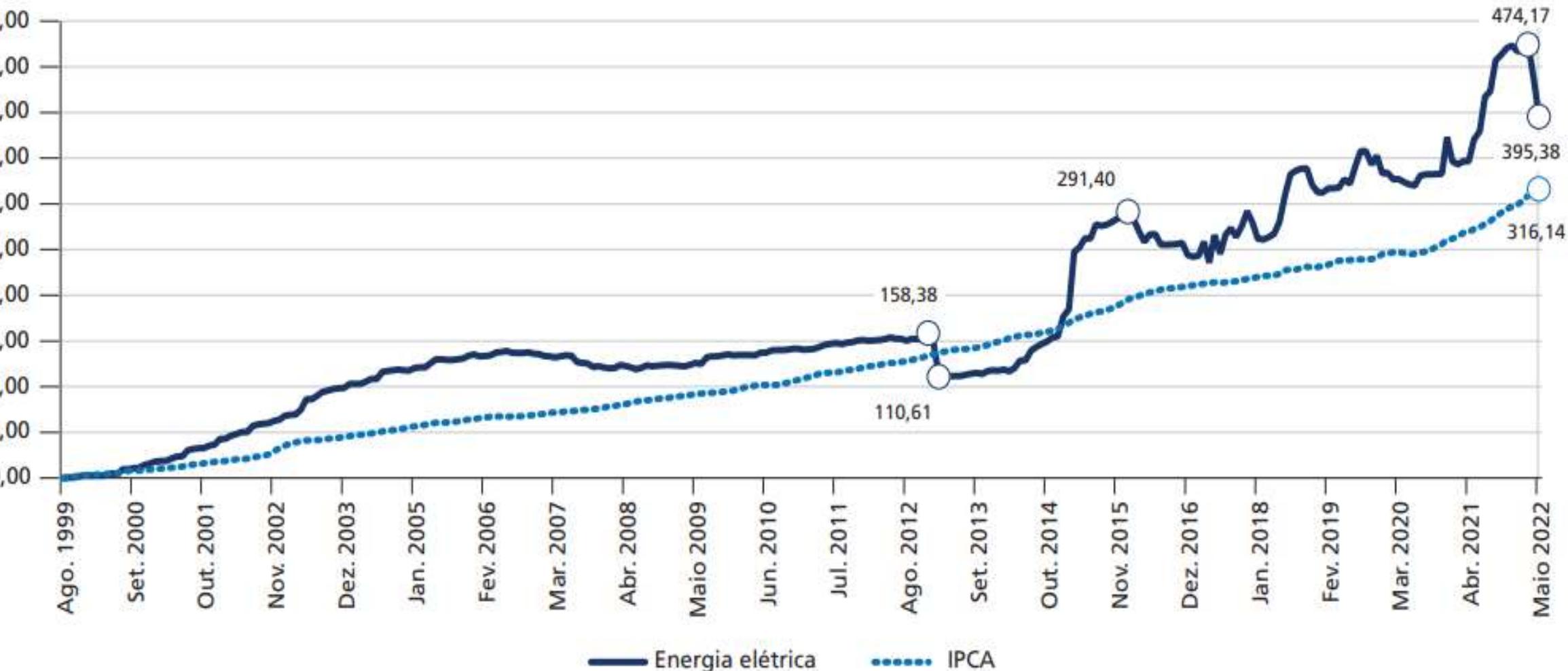


- Brazil has implemented an extensive and internationally recognized Rural Electrification Program ([Light for All Program](#));
- Expanding access to electricity to more than [16 million of people](#);

# Energy Poverty – Current Challenges

## General Data

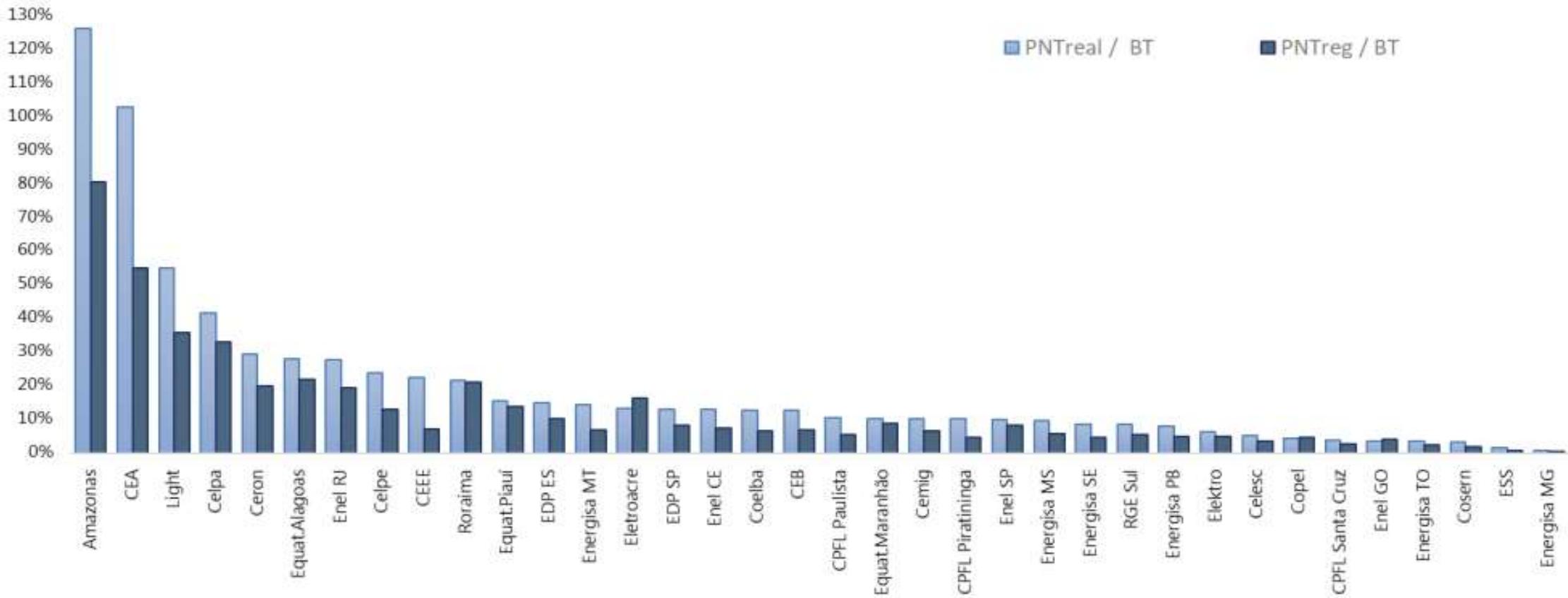
inflation measured (1999 – 2022)



# Energy Poverty – Current Challenges

## General Data

### Non-Technical Losses (2020)



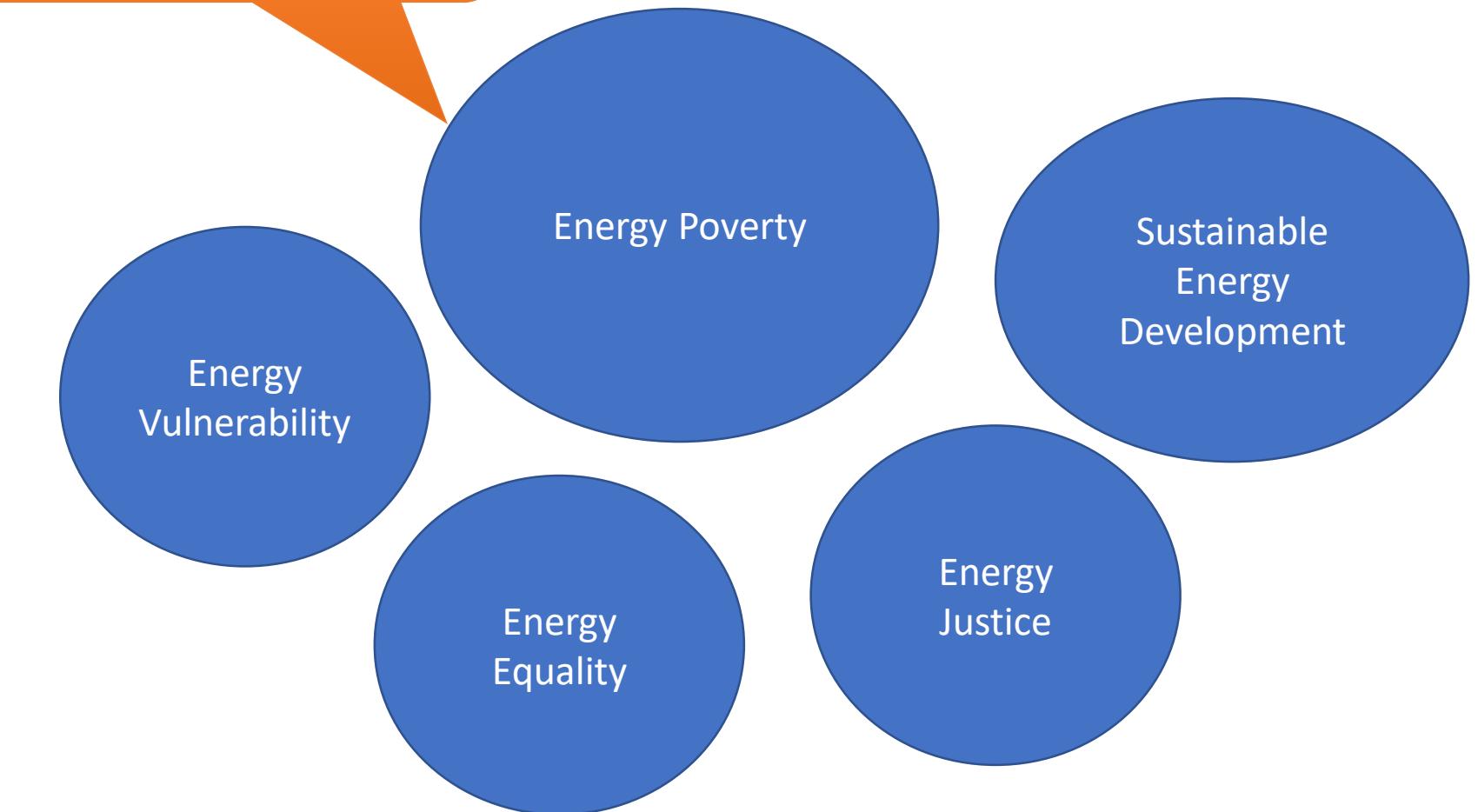
Source: ANEEL, 2020

([https://antigo.aneel.gov.br/documents/654800/18766993/Relat%C3%B3rio+Perdas+de+Energia+\\_Edi%C3%A7%C3%A3o+1-2021.pdf/143904c4-3e1d-a4d6-c6f0-94af77bac02a](https://antigo.aneel.gov.br/documents/654800/18766993/Relat%C3%B3rio+Perdas+de+Energia+_Edi%C3%A7%C3%A3o+1-2021.pdf/143904c4-3e1d-a4d6-c6f0-94af77bac02a))

## Energy Poverty – Current Challenges

Criticism: excess of terms can confuse and dilute the attention of public policies

Lack of Definition and/or consensus



# Energy Poverty – Current Challenges



Órgãos do Governo · Acesso à Informação · Legislação · Acessibilidade

Entrar

Agência Nacional de Energia Elétrica

Busca

""pobreza energética""

1 Resultado em todo o GOV.BR | Agência Nacional de Energia

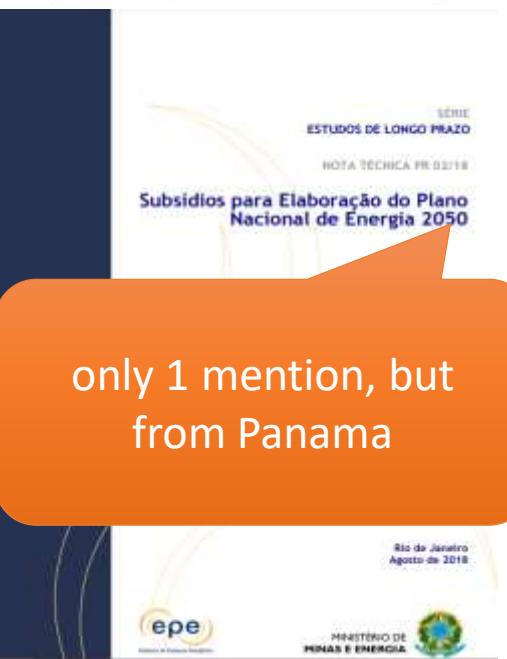
Serviços

Todos

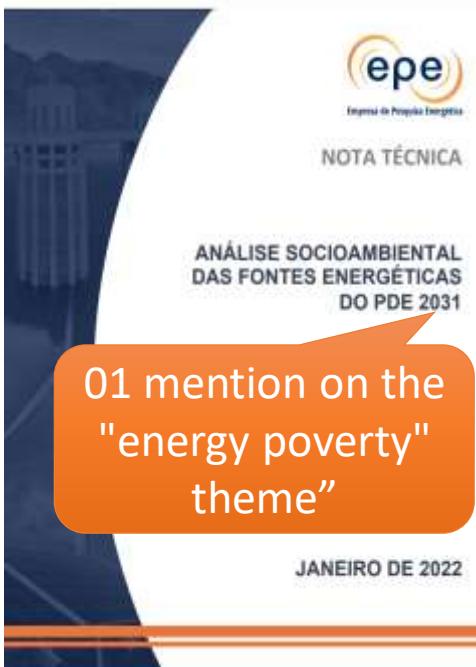
Homologar relatório de instalação de padrões de entrada ou kits de instalação interna

Conteúdo por "Padrão novo e kit de instalação interna".

Trimestralmente as distribuidoras, nos termos do Decreto nº 7520/2011 e da Resolução Normativa nº 488/2012, devem encaminhar a ANEEL relatório com a relação e valores dos padrões de entrada e/ou kits de instalação interna que foram instalados a cada trimestre. A Análise analisa os dados encaminhados.



only 1 mention - (focused on the connection concept)

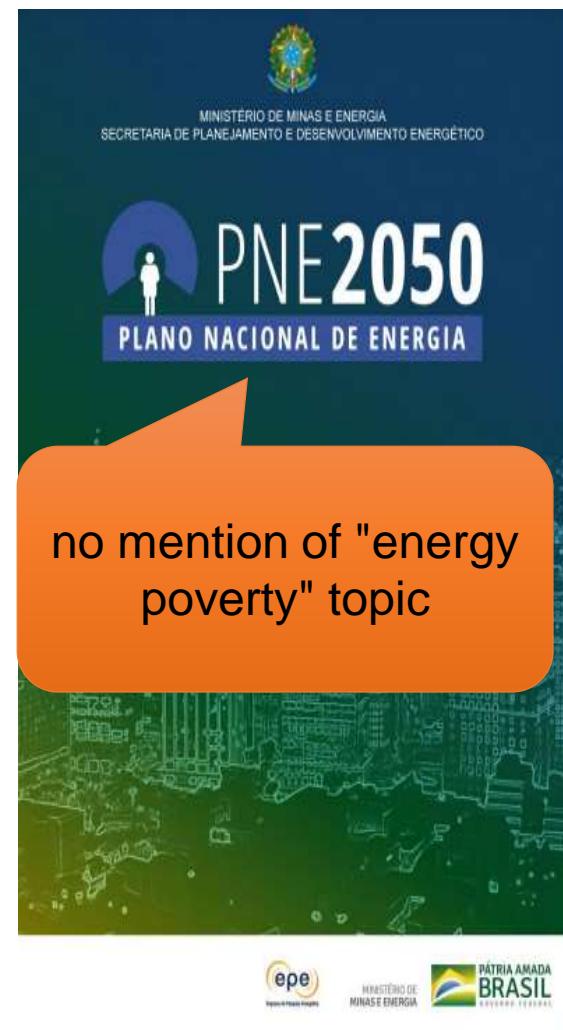


Estudos de Longo Prazo

Considerações sobre o Comportamento do Consumidor

only 1 mention, without addressing actions and goals

Documento de Apoio ao PNE 2050  
Dezembro de 2018



## Energy Poverty – Current Challenges (metrics)

Metric	Aproach	Percent	Population (million)	Source
Without access to Electric Energy Connection	Connection	0,003%	0,64	MME
No quality in Electric Energy supply	Consumption	9%	19	Tanaka, 2021
Delay in the electric energy bill (General) *(2021)	Income (1)	17,85%	36	Aneel**
Delayed electric bills (Low Income)* (2021)	Income (1)	39,43%	81	Aneel**
Use of Social Tariff (2020)	Income (2)	26,90%	56	Aneel



*What is the priority?*

*There will be no just energy transition without  
an approach that includes social aspects*

# A need for change



## Energy Poverty: what is the priority?

- Energy must be integrated as a key element for changes in the territory and materialization of solutions to promote health and well-being to the populations (Galvão, 2020);



### Sources:

- Deaton, A. (2015). *The Great Escape: Health, Wealth, and the Origins of Inequality*. Princeton University Press
- Proctor, R. N., and Schiebinger, L. (2008). *Agnostology: The Making and Unmaking of Ignorance*. Stanford University Press.

# Which areas of collaboration?



## Which areas of collaboration?

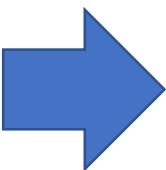
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- Low carbon technology;
- Climate protection
- Rural development
- Gender issues
- Education/training
- Potable water
- Health
- Waste management
- Policy to promote income generation;
- Governance

## One question:

### Macroeconomic panel:

- Fuel price increase;
- Loss of wage mass;
- High unemployment rate;
- Rising interest rates;



- Is it possible to make progress on **energy poverty** issues, under macroeconomic uncertainties, without the presence of long-term public policies?



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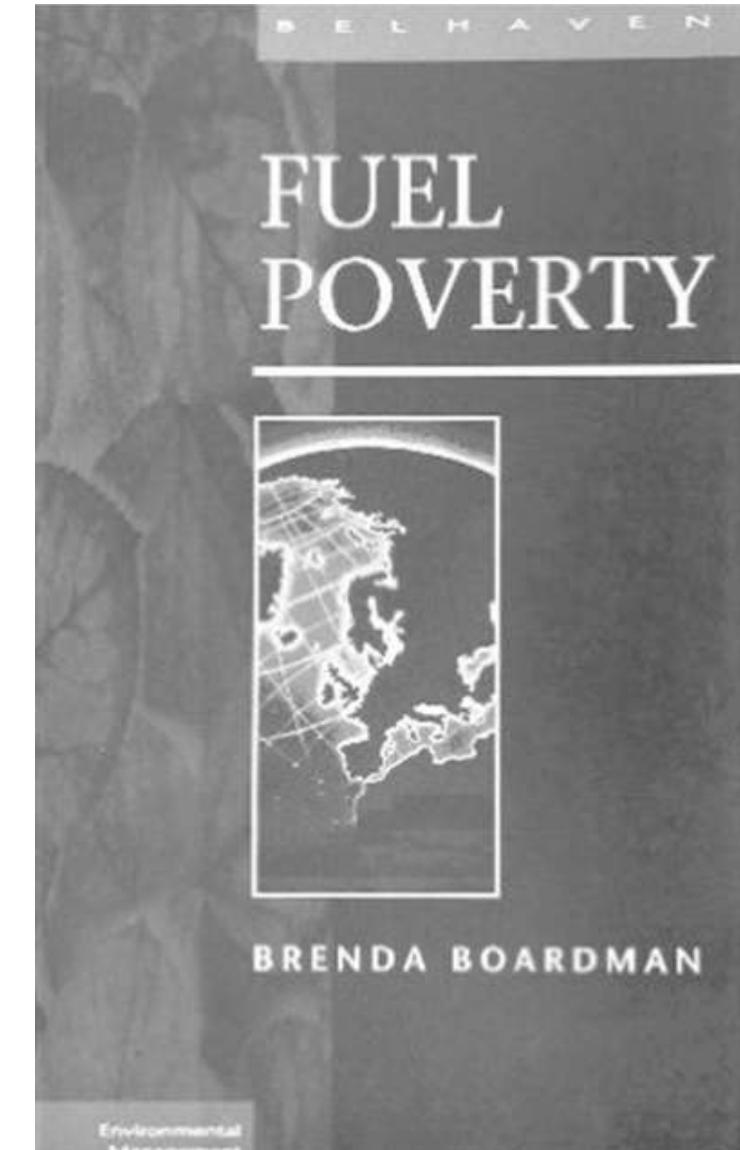


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## Origin Energy Poverty (Europe)

- 1970s oil crisis
- First noted by British government officials  
(Isherwood & Hancock, 1979)
- Developed in Boardman's book (1991)
- Now widely studied referred to mainly as energy poverty
- Boardman (1991):

*"Households unable to heat their homes to an adequate standard at reasonable cost"*



# Origin Energy Poverty (Brazil)

- Rural Electrification Programs
- First noted by Goldemberg, La Rovere & Coelho (2004): "*There is a close relationship between poverty and low electricity consumption, in parallel to the relationship between poverty and lack of electricity access*"
- Now in Brazil widely studied referred to mainly as energy poverty
- Pereira at al(2010): "*Energy poverty can also be understood as a lack of choice in access to energy that is adequate, safe, and reliable for economic and human development*"
- Brazilian government officials ???

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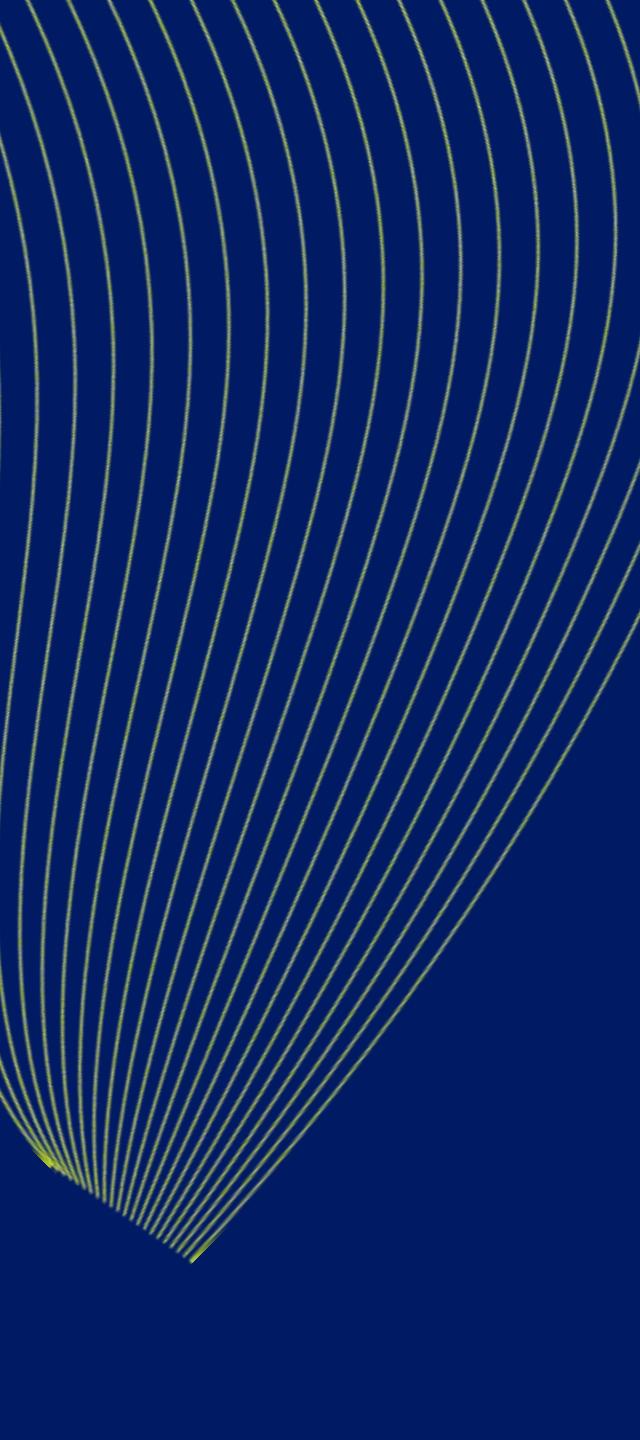
In 1993, the Brazilian electricity sector initiated a restructuring process by unbundling the generation, transmission, and distribution components of the existing companies. This ultimately led to the privatization of most distribution assets and some of the generation assets. However, little attention was paid in the process to the expansion of services to low-income and rural areas. This paper characterizes the main policy, institutional and regulatory barriers that have negative impacts on electricity supply to low-income consumers in rural and urban areas in the country. It also analyzes the effect of the power sector reform and discusses existing institutional arrangements that may affect the policy goal of universal access to electricity. Finally, it provides recommendations for feasible developments in policy, regulatory and institutional arrangements that would facilitate the expansion of electricity supply to low-income consumers and rural areas.

## 1. Introduction

The Brazilian power sector is divided into two large systems, the interconnected one and the isolated one [Goldemberg et al., 2002]. The first one, with 80,000 MW of installed power, includes the Northeast-Southeast-South transmission line.<sup>[1]</sup> The isolated system includes small local grids, mainly in the northern Amazon.

The energy supply of off-grid systems is based on diesel generators. There is an enormous consumption of diesel in the electricity generation and fuel transportation within the region. There are presently nearly 1,000 power plants supplying electricity for isolated cities and villages in the Amazon using diesel oil. Almost 700 units have an installed power capacity below 500 kW [Goldemberg, 2006]. The high overall fuel consumption is due not only to the electricity generation itself, but also to the local transportation, which relies exclusively on boats.

The 1988 Brazilian Constitution considers the distribution of electricity to be an essential public service for which the federal government assumes full responsibility, either directly or through designated concessions or permits. There is a consensus emerging in Brazil related to the imperative need to supply electricity to all of the population as a basic public service. However, lack of electricity access is a fact of life for many rural and also urban households.



## Energy Transition

It should be people-centric;

There should be a transdisciplinary discussion;

There must be a fruitful discussion between developed and developing countries, incorporating the issue of solidarity as well as the self-determination of peoples, guided by ethics and a sense of justice;

# Energy Poverty – Current Challenges

## Brasi

**Definição - Não há uma definição ainda estabelecida pelos órgãos governamentais:**

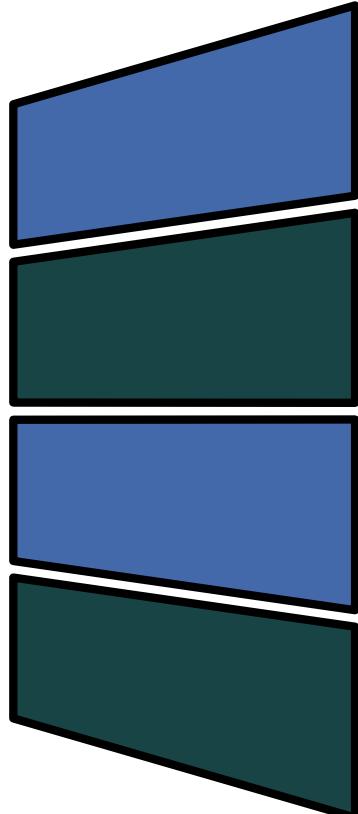
- Ótica da conexão - caso se aborde o conceito pela questão da conexão (acesso à rede elétrica) teríamos 99,7% da população com conexão, restaria **640 mil pessoas sob a situação de pobreza energética** (MME, 2022);
- Ótica do Consumo - caso se aborde o conceito pela questão do fornecimento de “qualidade, seguro e de confiança”, teríamos 9% da população sob a situação de pobreza energética, *i.e., 19 milhões de pessoas* (sem contar os domicílios sem qualquer acesso à energia elétrica) (IBGE - POF, 2019) (Tanaka, 2021).
- Ótica de Renda - caso se aborde o conceito pela questão da insuficiência de renda, considerando aqueles que acessam a tarifa social (entre outras questões) a situação de pobreza energética atinge **56 milhões de pessoas** (Pereira, Silva & Galvão, Not Published);

Source: Pereira, Silva & Galvão (Not Published). The Last Mile is the Longest Mile – Energy Poverty in Brazil

Tanaka, 2021. Energy poverty in Brazil, current situation, future perspectives and the impact of new renewables



# Areas of collaboration



Growing integration of energy poverty in activities of publica and private institutions & political legitimisation



Economic inequalities undermining the principals & benefits of universal access to energy in Brazil



Lack of focused monitoring, reporting & understanding



Large divides between stakeholders



## **OBPE functions:**

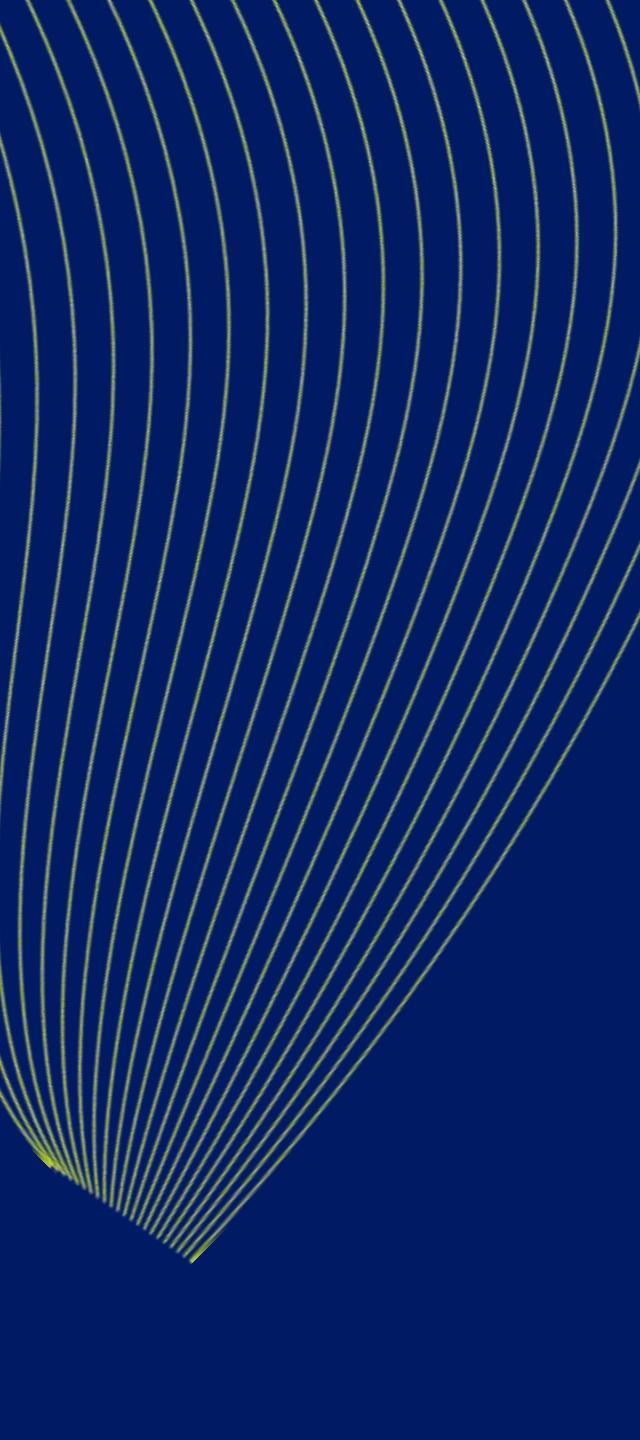
- Promote debates (transdisciplinary), including energy planning, social planning and climate planning;
- Form a Brazilian energy poverty network;
- Propose actions to alleviate the financial burden of low-income families;
- Propose low carbon technological alternatives (micro and macro);
- Promote technological innovation and social issues (Social Technologies);
- Exchange of researchers;
- Establish national and international partnerships;
- Training & Data Structuring



## **OBPE functions:**

- Encourage the establishment of action plans (at all levels);
- Promote events beyond the academy;
- Develop new evaluation metrics;
- Produce and promote non-technical publications to access other audiences;
- Produce and promote technical publications (national and international);
- Carry out and promote events beyond academia;
- Access national and international funding;





## Outcomes

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- Reduce of energy poverty
- Coordination of actions (Public and private);
- Promotion of new technologies;
- Promotion of “fair (just) energy transition”;
- Positive impact on climates changes negotiation;
- Promotion nexus with “poverty transport” (“collective transportation);

# Future Partnership:



Universidad Nacional  
Autónoma de México



**ENPOR**

**Energy Poverty  
Dashboard goes live**

Our energy justice information and  
action hub, the Energy Poverty  
Dashboard, now ready to be  
navigated!

