



**Universidade de São Paulo**

**Escola Superior de Agricultura "Luiz de Queiroz"**

**Departamento de Engenharia de Biossistemas**



**LEB 0490 – Sustentabilidade Energética em Sistemas Agrícolas**

# Balanço Energético Nacional

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# Matriz energética - Brasil



<https://www.epe.gov.br/pt/publicacoes-dados-abertos/publicacoes/balanco-energetico-nacional-benr>



# Reflexão

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Quais as principais fontes de energia no Brasil?

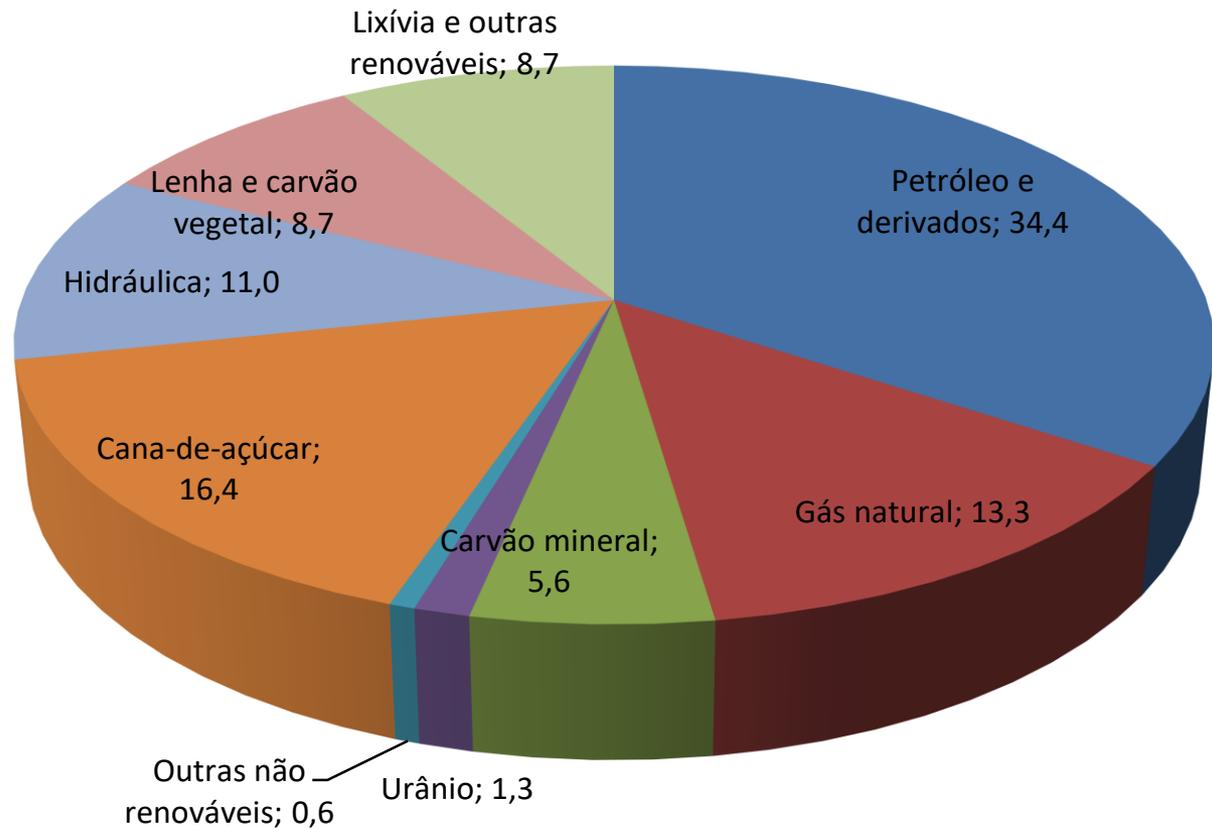


Quais os setores que mais consomem energia no Brasil?



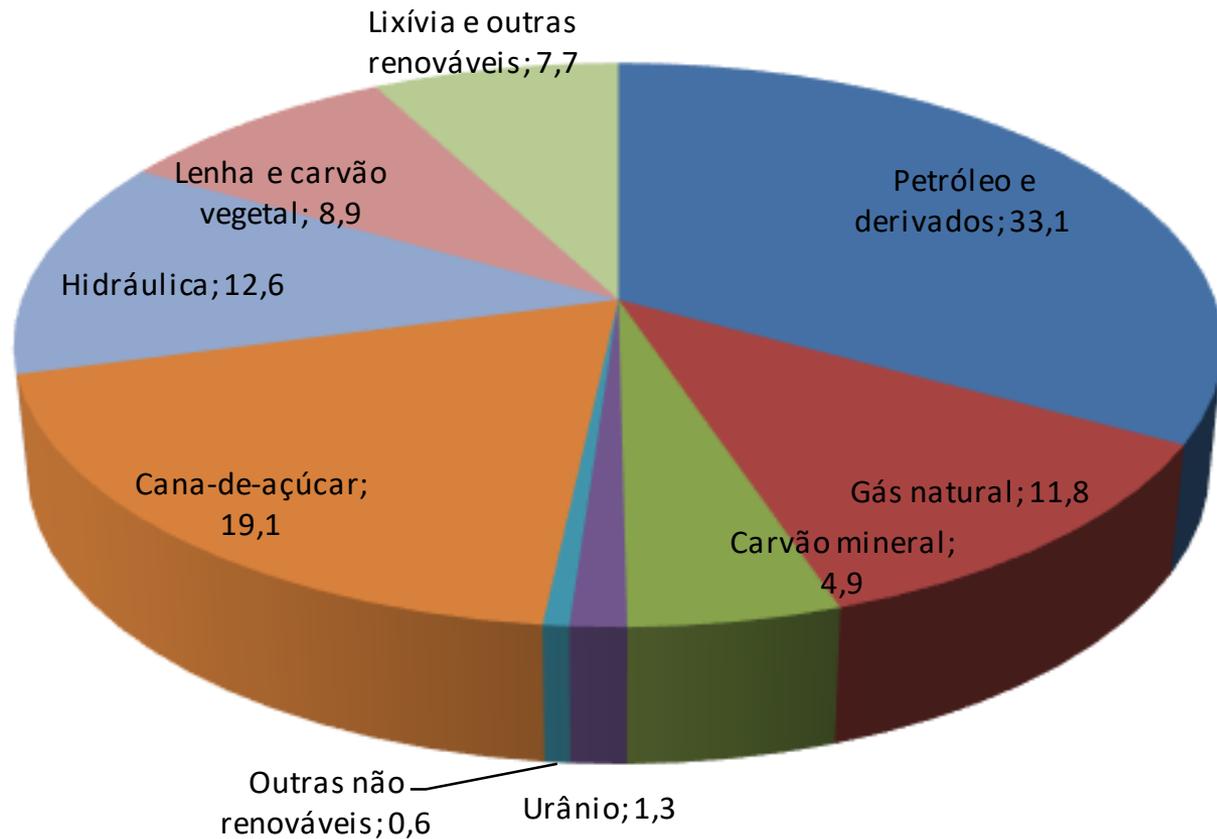
# Matriz energética – ano base 2021

**Recursos renováveis**  
**44,7%**



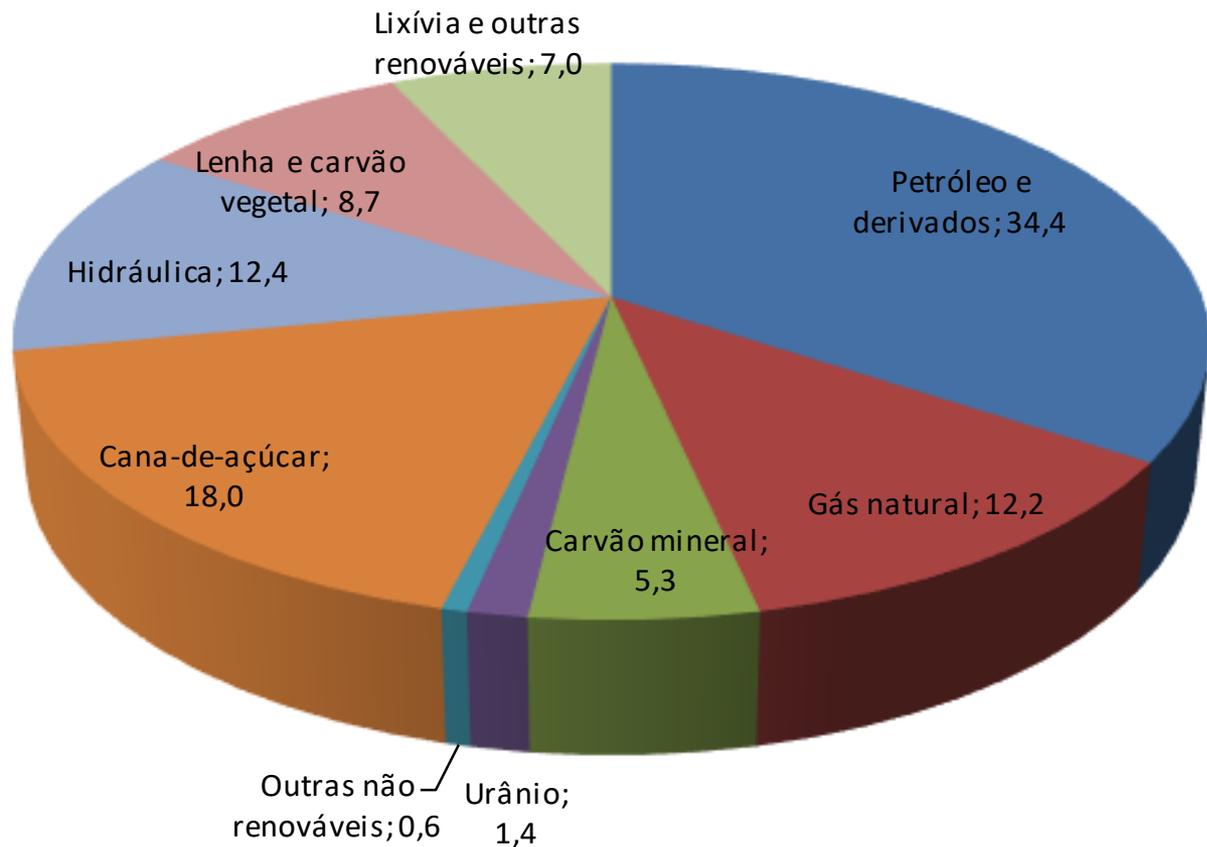
# Matriz energética – ano base 2020

**Recursos renováveis**  
**48,4%**



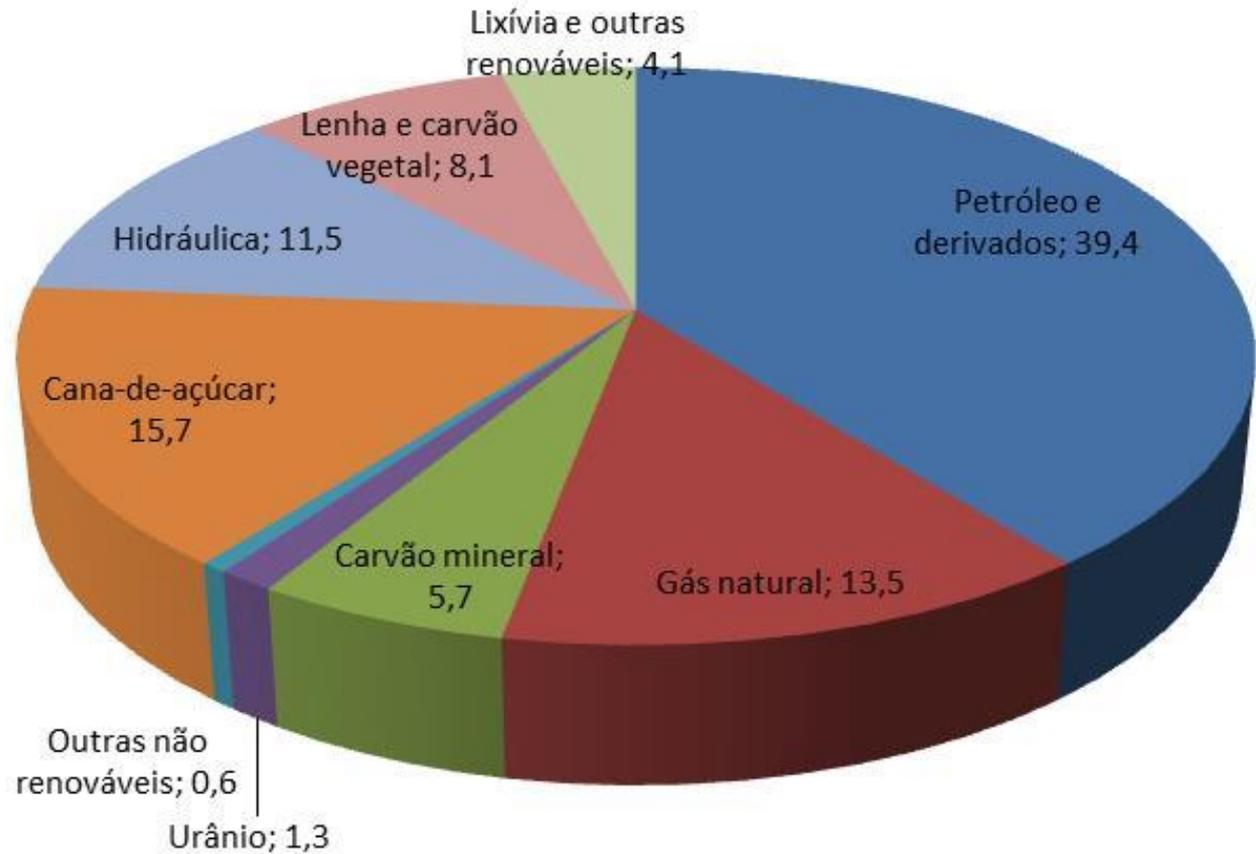
# Matriz energética – ano base 2019

**Recursos renováveis**  
**46,1%**



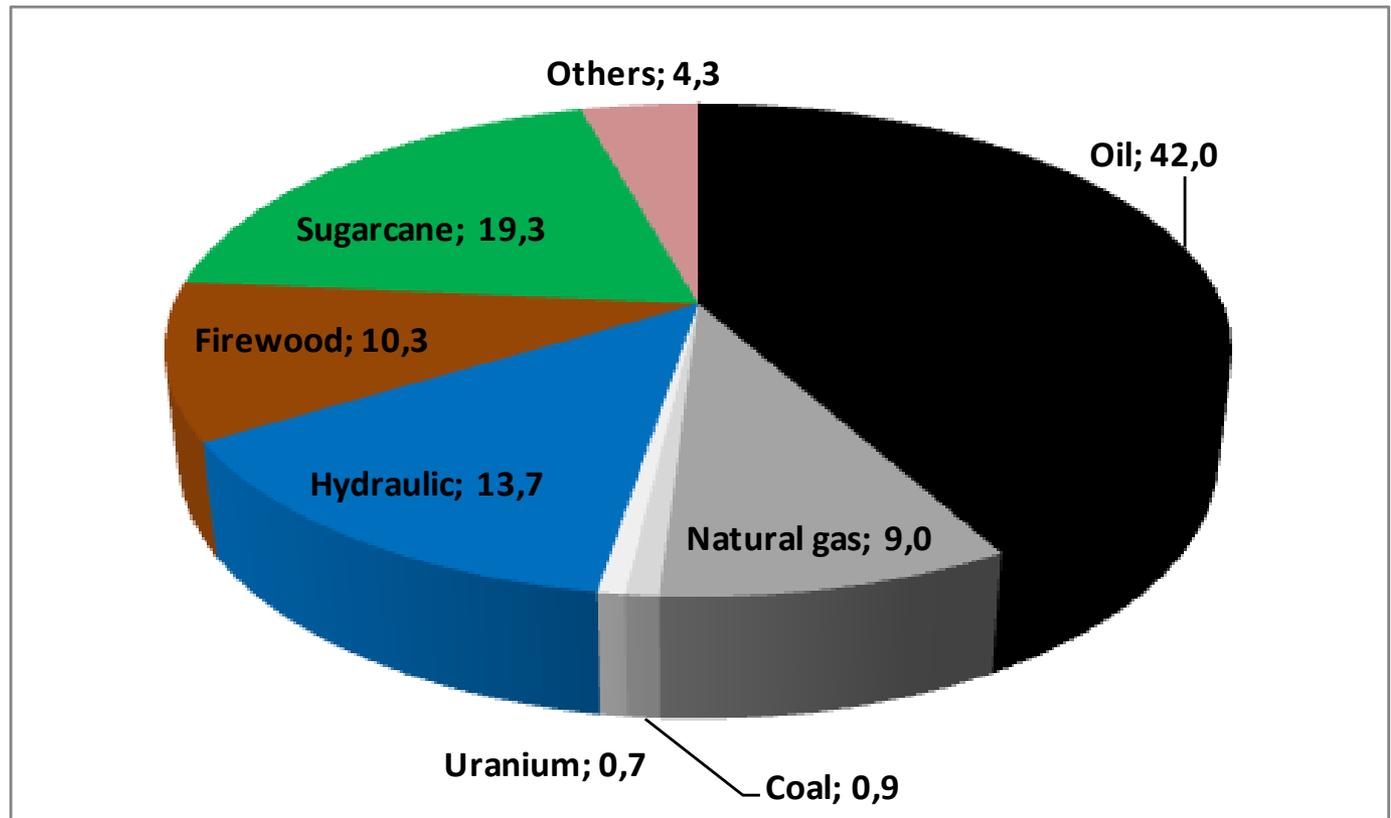
# Matriz energética – ano base 2014

**Recursos renováveis**  
**39,4%**

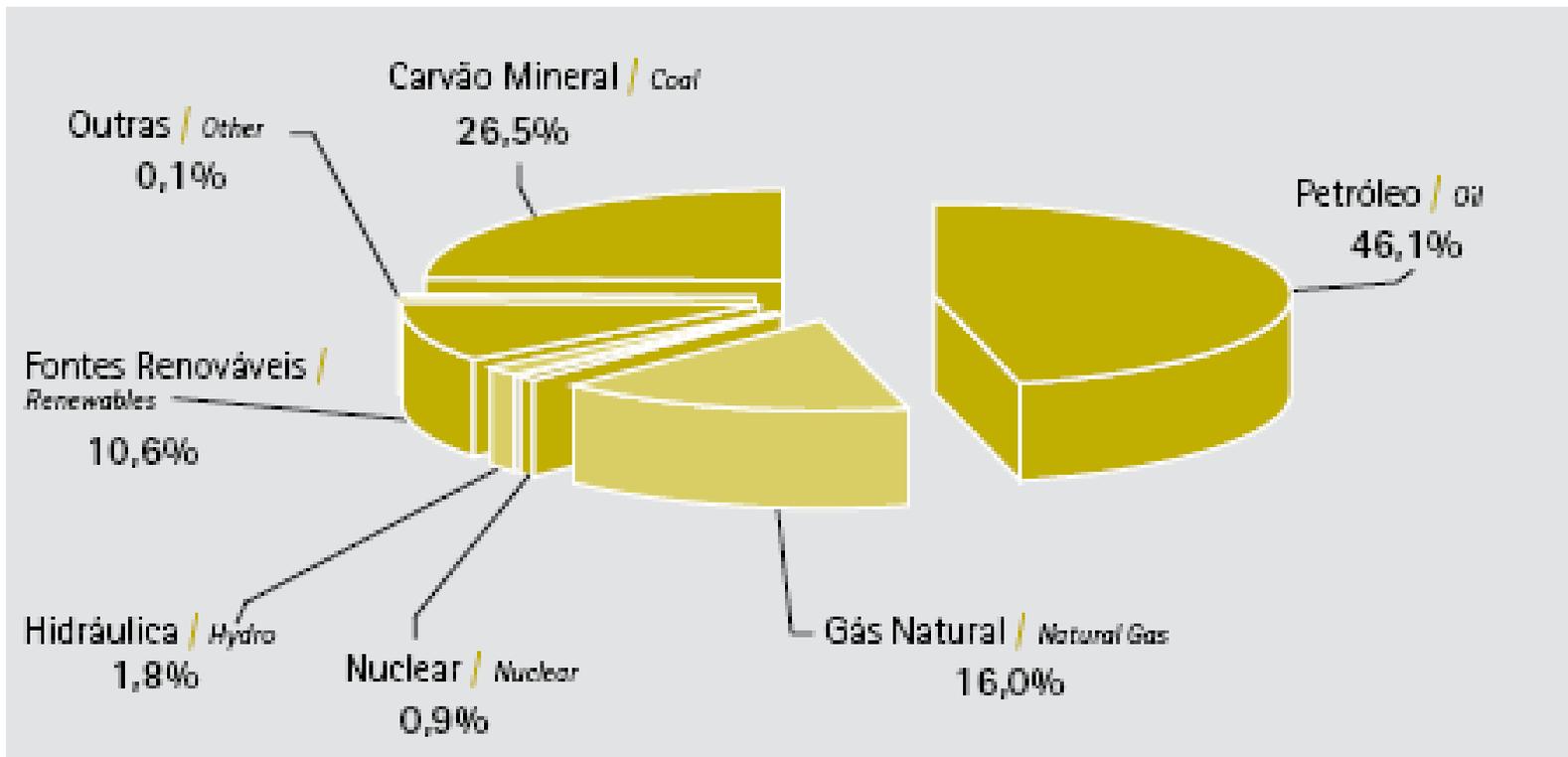
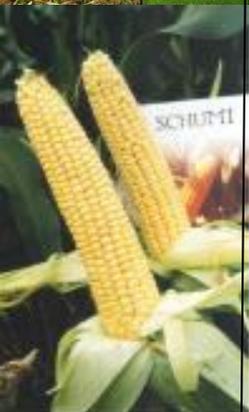


# Matriz energética – ano base 2010

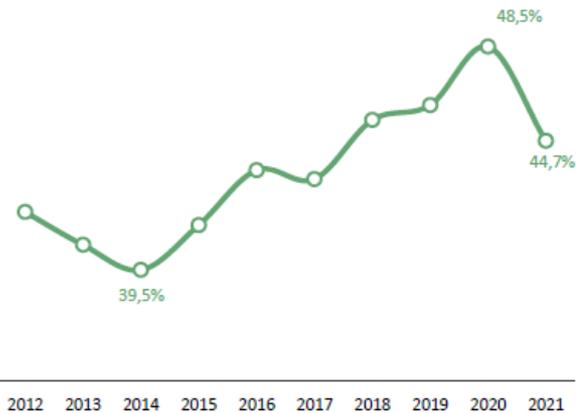
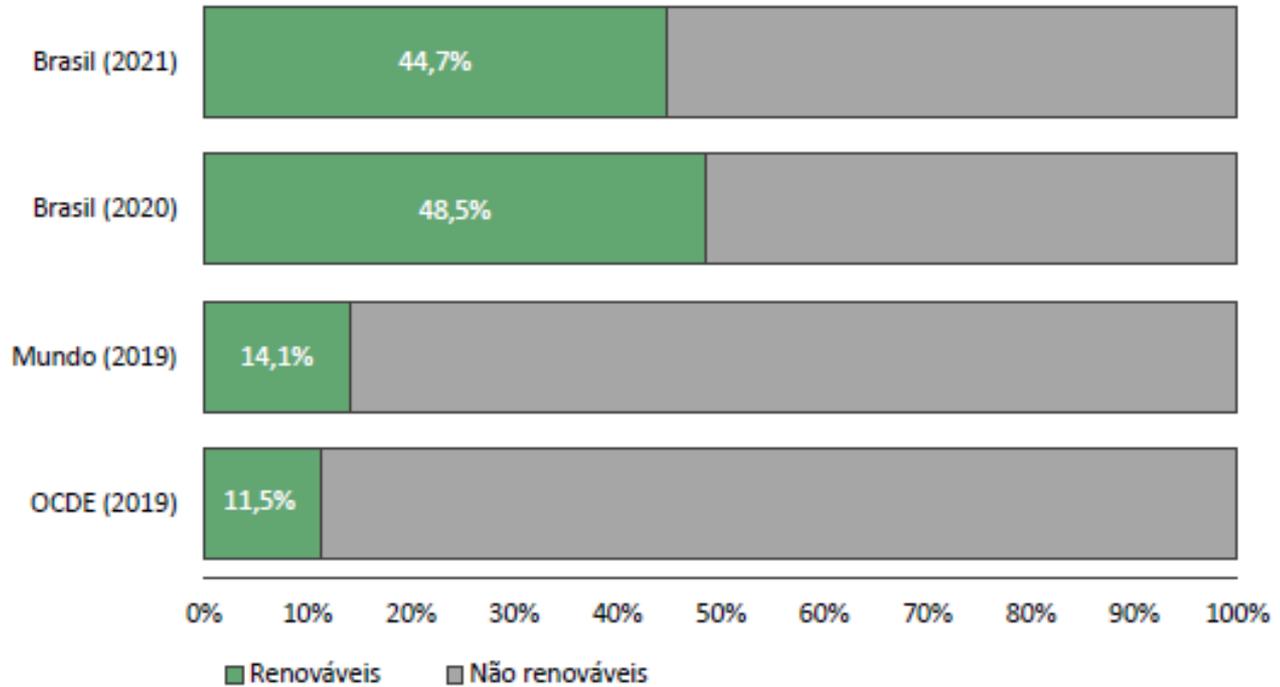
**Renováveis: 47.5 %**



# Em 1973 ?????



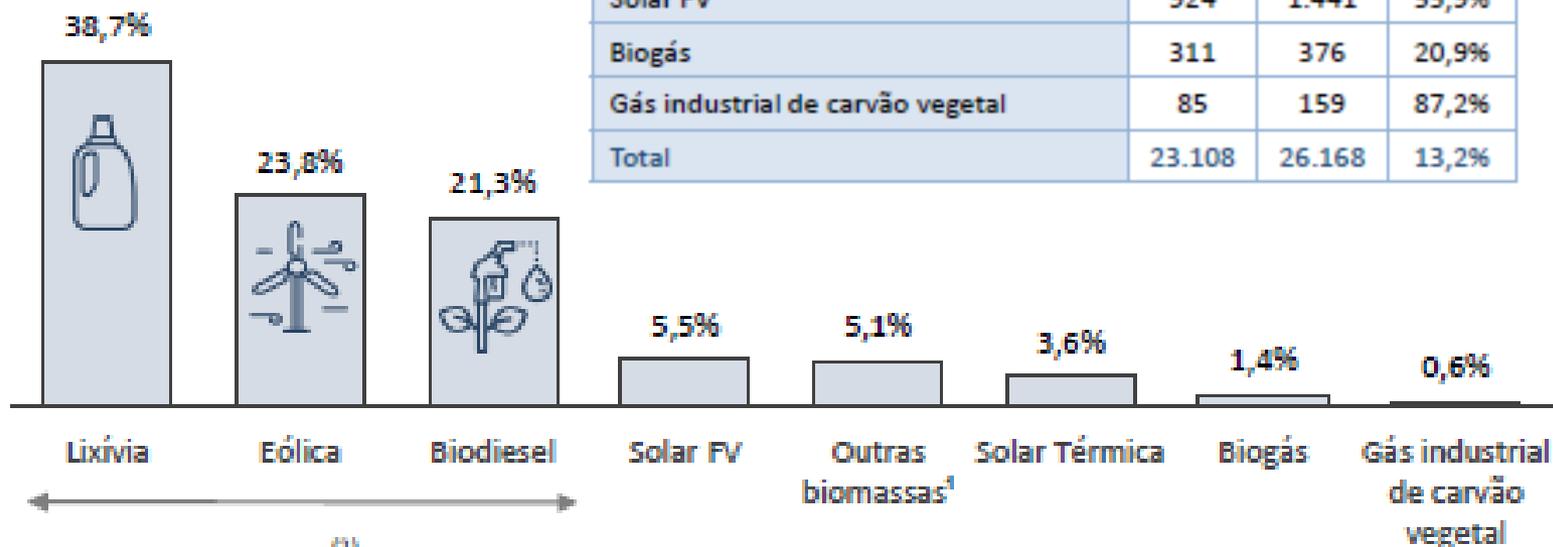
# Matriz energética



# Composição de "Outras renováveis"

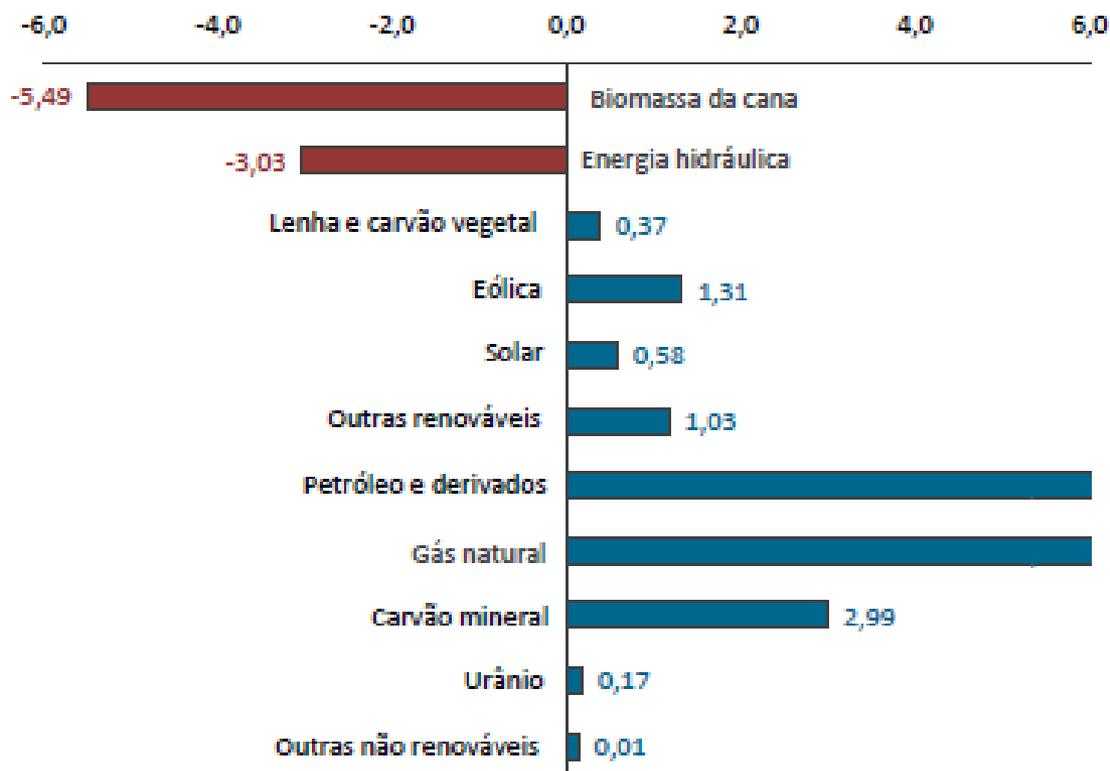


Outras renováveis (10 <sup>3</sup> tep)	2020	2021	Δ 21/20
Lixívia	9.576	10.128	5,8%
Eólica	4.906	6.217	26,7%
Biodiesel	5.300	5.570	5,1%
Outras biomassas <sup>1</sup>	1.139	1.347	18,3%
Solar Térmica	867	930	7,3%
Solar FV	924	1.441	55,9%
Biogás	311	376	20,9%
Gás industrial de carvão vegetal	85	159	87,2%
<b>Total</b>	<b>23.108</b>	<b>26.168</b>	<b>13,2%</b>

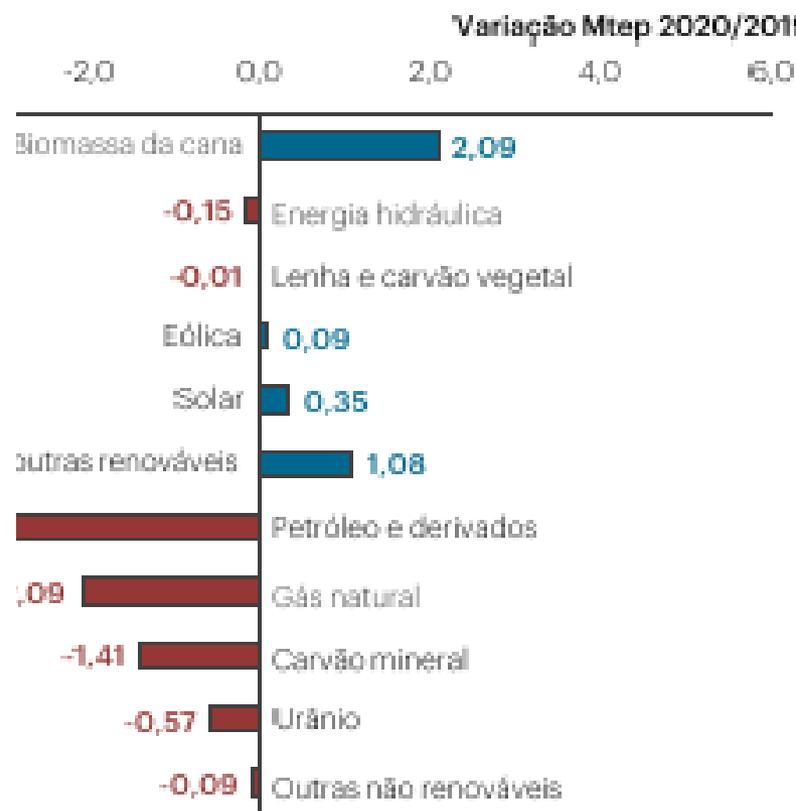




# Variação anual



EPE (2022)



EPE (2021)



# Consumo por setor



Transportes  
32,5%



Indústrias  
32,3%



Residências  
10,9%



Setor Energético  
9,5%



Agropecuária  
5,0%



Serviços  
4,8%



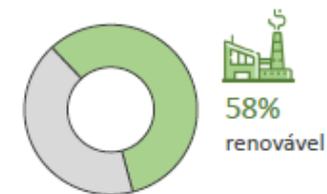
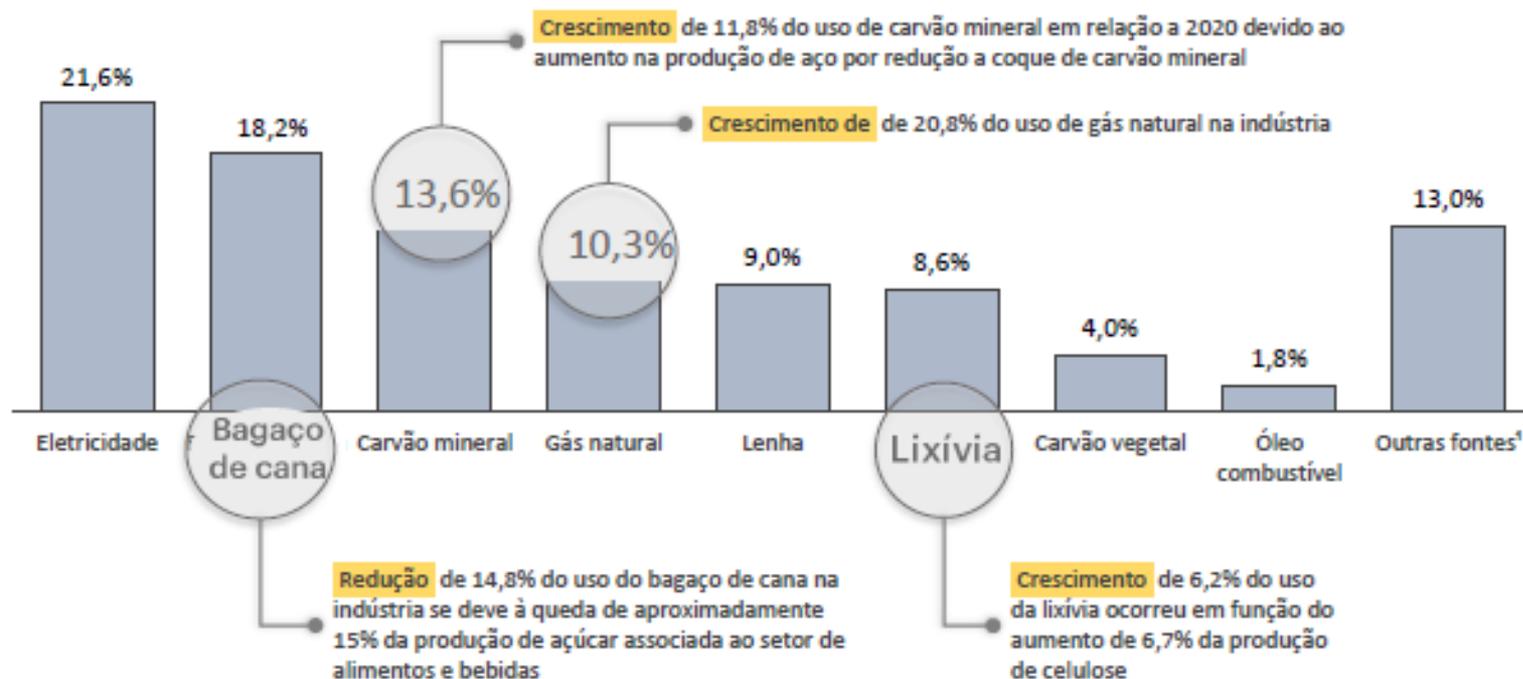
Uso não energético  
5,1%

2021  
262,1 Mtep

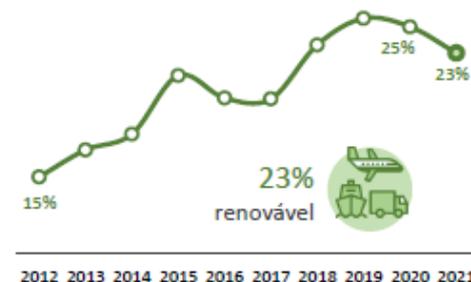
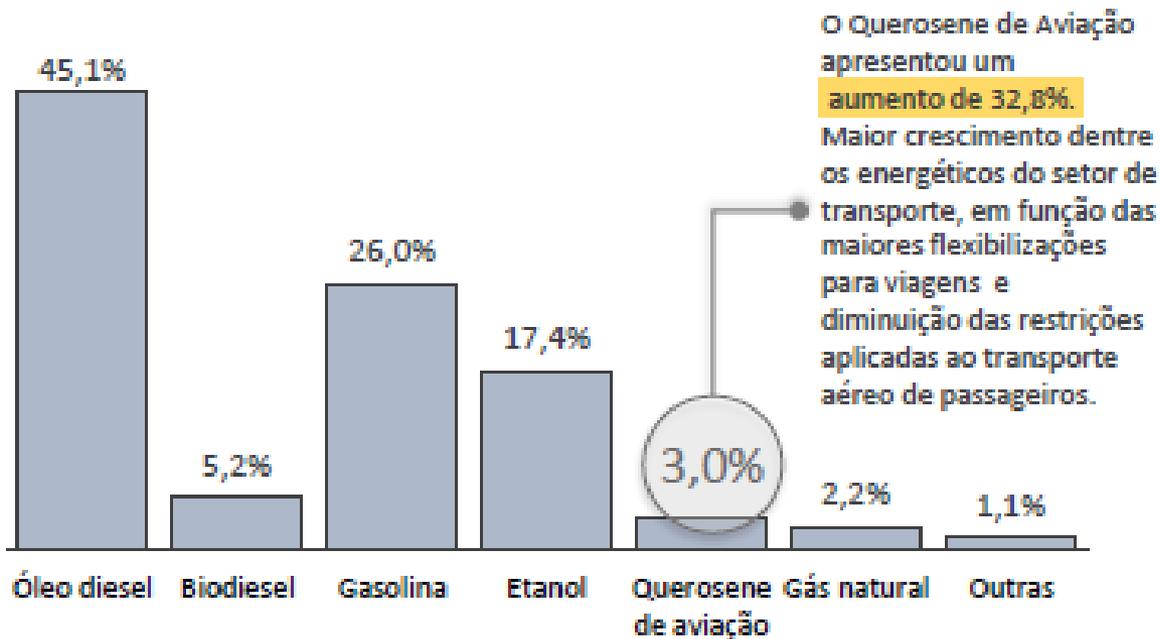
2020  
253,4 Mtep

↑ Aumento de 3,5%

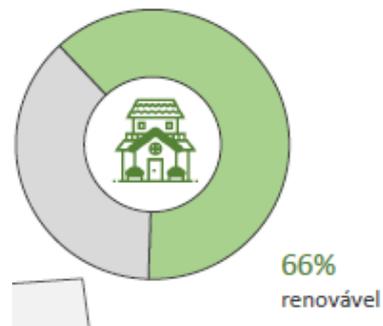
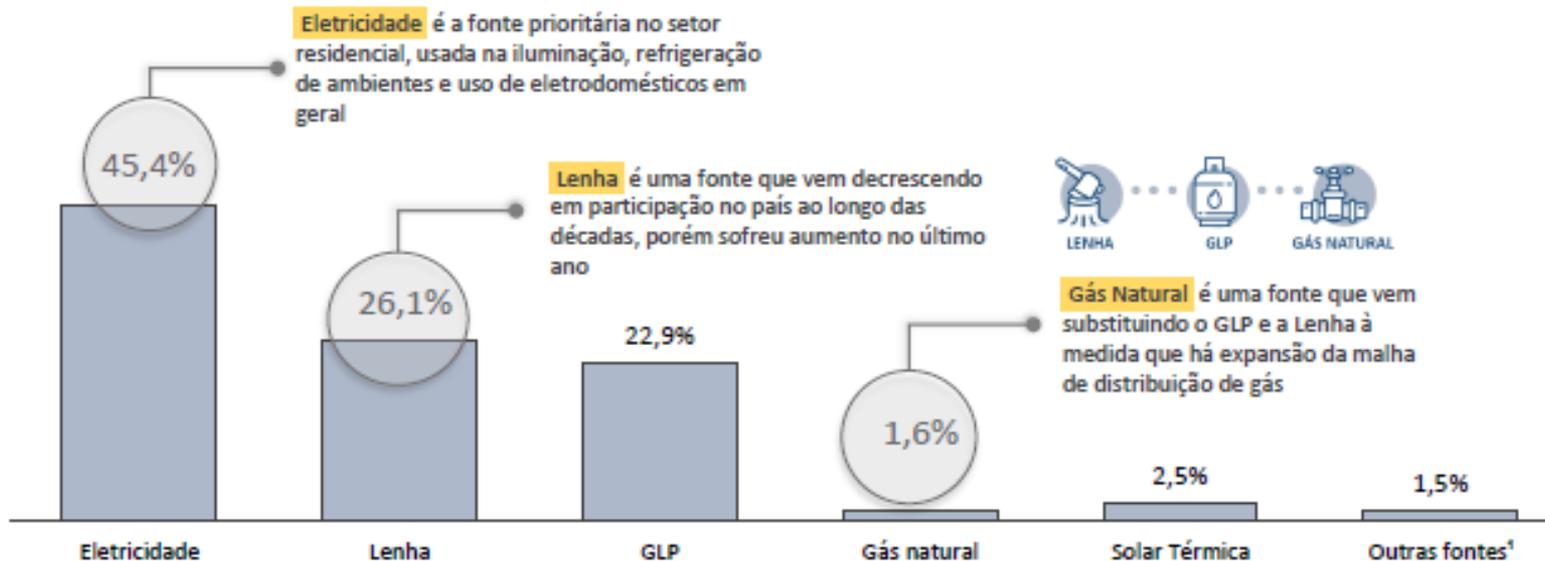
# Indústria



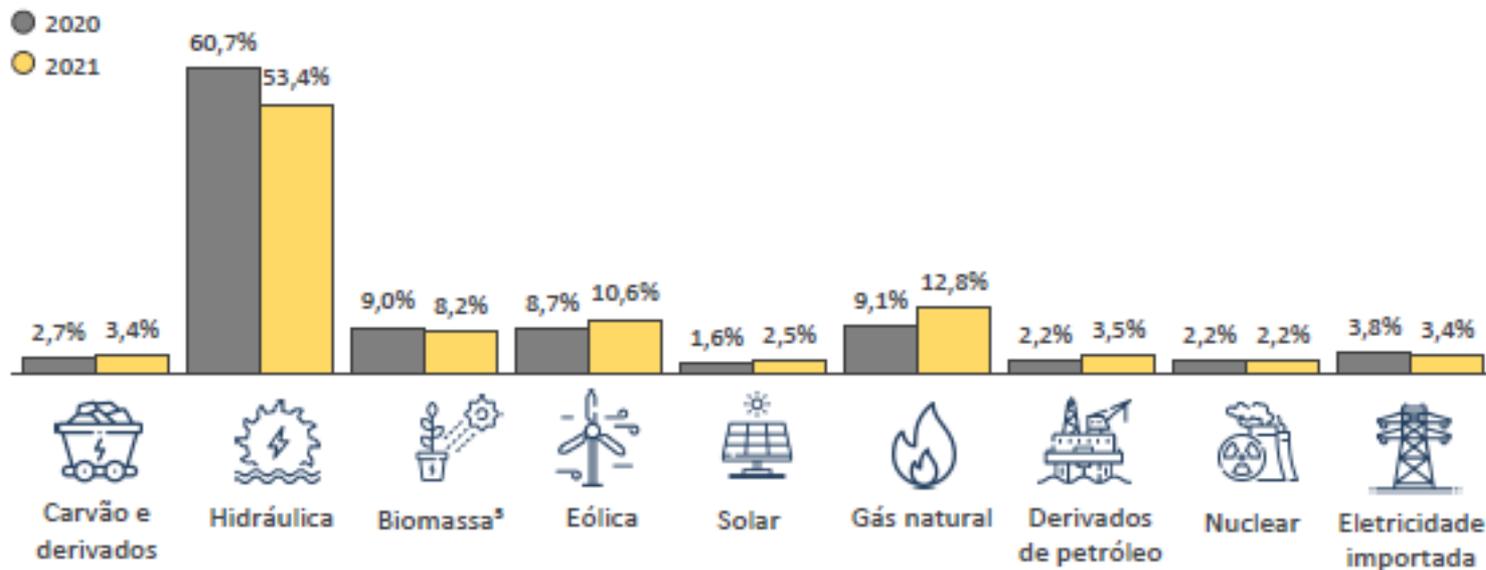
# Transportes



# Residencial



# Matriz elétrica



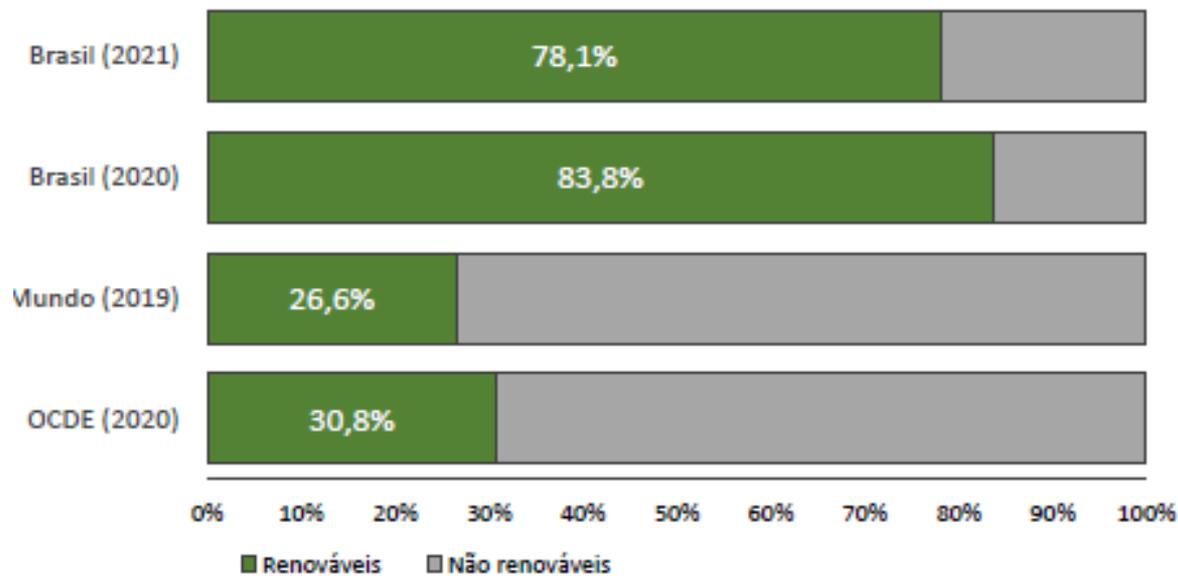
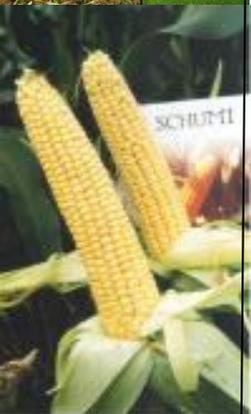
2021 (TWh)  
 Oferta Total: 679,2  
 Oferta hidráulica: 362,8

2020 (TWh)  
 Oferta Total: 653,5  
 Oferta hidráulica: 396,4

↑ Aumento de 3,9%  
da Oferta Total

↓ Redução de 8,5%  
da Oferta hidráulica

# Matriz elétrica



2012 2013 2014 2015 2016 2017 2018 2019 2020 2021